NATIONAL GEOGRAPHIC

HISTORY

POMPEII
NEW TREASURES REVEALED

HANGING GARDENS OF BABYLON
LOST WONDER OF ANTIQUITY

SUFFERING FOR SUFFRAGE
FIGHT FOR THE 19TH AMENDMENT

DAWN OF THE ATOMIC AGE
THE WORLD'S FIRST NUCLEAR BOMBS

PLUS:

Kilwa's Medieval Merchants
Traders of the Swahili Coast

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Centuries ago, Persians, Tibetans and Mayans considered turquoise a gemstone of the heavens, believing the striking blue stones were sacred pieces of sky. Today, the rarest and most valuable turquoise is found in the American Southwest— but the future of the blue beauty is unclear.

On a recent trip to Tucson, we spoke with fourth generation turquoise traders who explained that less than five percent of turquoise mined worldwide can be set into jewelry and only about twenty mines in the Southwest supply gem-quality turquoise. Once a thriving industry, many Southwest mines have run dry and are now closed.

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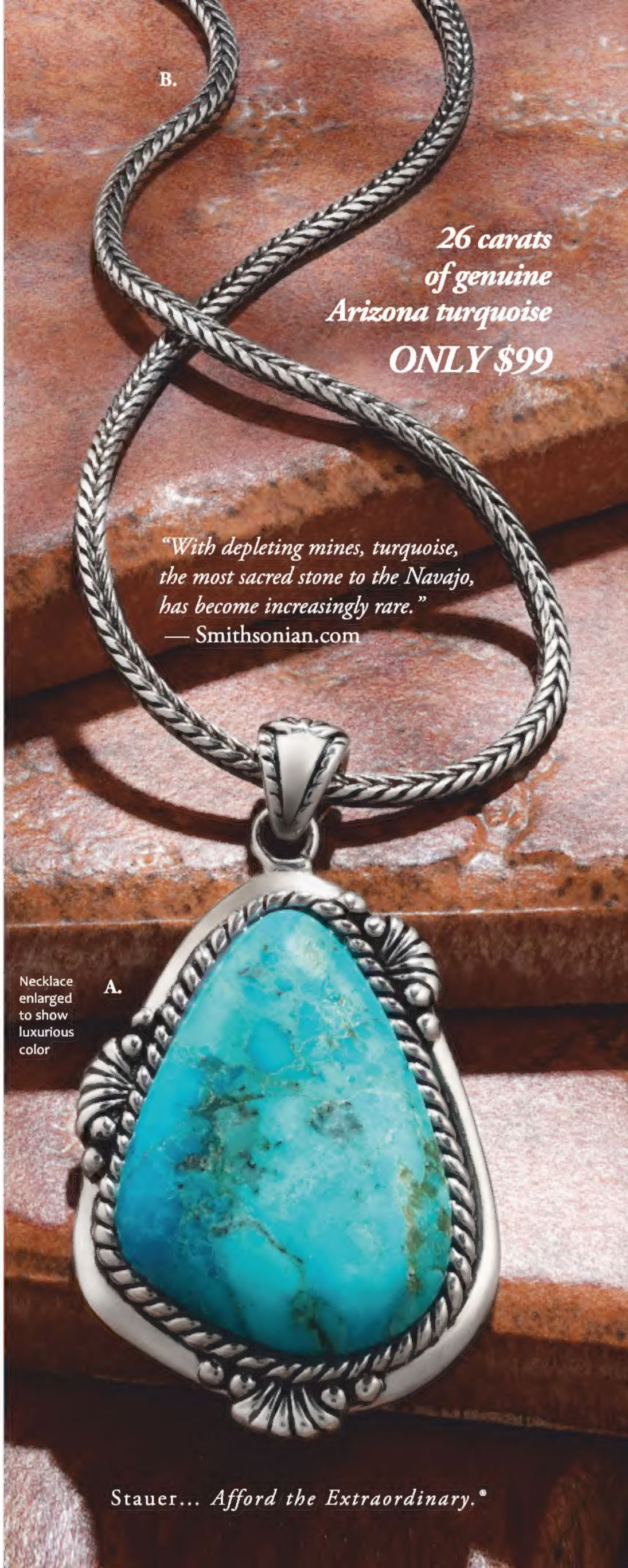
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A.
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Historians like to debate about "watershed moments." I won't go into the origins of the phrase here, but it's often used to describe an important moment in history.

But true watershed moments are more than important. They are events where a hard line can be drawn between before and after. On one side of the line is life as we knew it, on the other is life as we know it, and the two look nothing like each other.

It's not often that ***HISTORY*** has one issue feature multiple watershed moments, but this one does. The eruption of Vesuvius and the destruction of Pompeii, passage of the 19th Amendment, and deployment of the nuclear bomb all qualify. Each one of these events is a marker that clearly divides history into a distinct period of before and after.

As I write this letter, it feels like we are experiencing a watershed moment right now as COVID-19 spreads around the world. Doesn't New Year's Day 2020 feel like it happened decades, rather than months, ago? As we all endure this moment of crisis, I pray that everyone stays safe and healthy so that we can all meet again—in the world as we will come to know it.

Amy Briggs

Amy Briggs, Executive Editor

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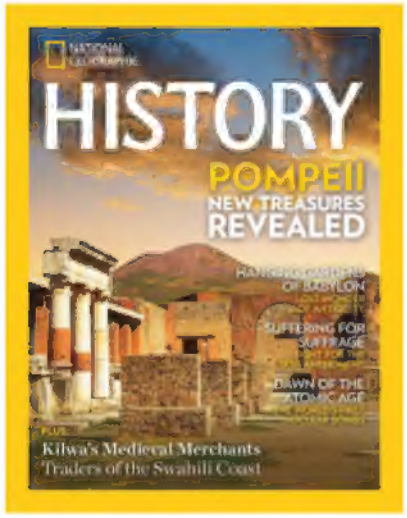

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HISTORY

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MYSTERY AND WONDER
In the absence of archaeological evidence for Babylon's Hanging Gardens, many artists have had to imagine their splendor, as in this illustration by Iraqi artist Kais Jacob Ishak.

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The lush park that rose above Babylon is the only one of the seven ancient wonders that has left no trace. New research has trawled ancient accounts to arrive at a startling theory—perhaps the gardens were not in Babylon at all.

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Picketing the White House, the Silent Sentinels boldly challenged President Wilson to back women's suffrage. Braving violent mobs and imprisonment, they persisted until the 19th Amendment became the law of the land.

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In summer 1945 the United States planned to unleash its devastating secret weapon—the atomic bomb—on Japan, outlining a strategy that went beyond Hiroshima and Nagasaki.

PROTEST SIGNS WERE KEY TO U.S. SUFFRAGISTS' PROTESTS IN 1917.

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A rare mass grave in rural England has revealed grim insights into how the countryside was overwhelmed by the dead and dying during the Black Death pandemic.

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Medieval engineer Ismail al-Jazari made the first programmed robot in the 1100s. Among his other inventions were fabulous automatons to dazzle kings and practical pumps to help farmers.

10 DAILY LIFE
Snow-cooled drinks were an ancient treat. Later, the method to freeze milk or fruit spread through Renaissance Europe until the whole world would scream for ice cream.

90 DISCOVERIES
The coral-stone monuments of Kilwa stunned travelers, drawn to the East African island city for its trade in gold. Historians are still piecing together Kilwa's complex history, a rich blend of African, Arabian, and Persian cultures.

UNIVERSITY OF SHEFFIELD, ANTIQUITY PUBLICATIONS LTD

WITH ARMS CAREFULLY CROSSED, this skeleton (above) was found in a mass grave at Thornton Abbey, Lincolnshire, England. Despite the catastrophic loss of life in the mid-14th-century pandemic, few such burials have been found from this era. The discovery at Thornton Abbey has shed light on conditions in a rural English community overwhelmed with the sick and dying.

FOUNDED IN 1139, THORNTON ABBEY WAS ONE OF THE RICHEST MONASTIC CENTERS IN ENGLAND. LOCAL BLACK DEATH VICTIMS FLOCKED HERE IN THE MID-1300S IN THE HOPE OF RECEIVING A CHRISTIAN BURIAL.

ICP/AGE FOTOSTOCK/ALAMY

NG MAPS

THE MASS GRAVE containing victims of the Black Death was found in the grounds of Thornton Abbey in Lincolnshire, England. The pandemic that ravaged Europe in the mid-14th century killed half of England's population.

A MEDIEVAL PANDEMIC

Rare Find Reveals New Insights Into Black Death

Discovery of a mass burial by a team of researchers reveals how the English countryside was devastated by the bubonic plague.

Digging in the English countryside, archaeologists have found evidence that gives valuable insights into the catastrophic effects of the Black Death. A mass grave containing 48 bodies was found on the grounds of Thornton Abbey in Lincolnshire, 150 miles north of London.

The Black Death

In 1347 the bubonic plague began its deadly sweep across Europe, reaching England a year later. It would kill an estimated 25 million people, about a third of Europe's population, by 1351. Common symptoms of the disease, caused by the bacterium *Yersinia pestis,* were fever, vomiting, and swollen lymph nodes, called buboes. These enlarged glands often turned black, which gave the disease its dark nickname.

The Black Death caused chaos in cities. In Florence, Italy, the poet Giovanni Boccaccio observed how frightened city-dwellers often fled to the country: "Some . . . affirmed that there was no

ENCOUNTERS WITH DEATH

AFTER THE BLACK DEATH ravaged Europe, an artistic trend emerged that would last for centuries. Called memento mori, which means "remember you must die" in Latin, it is believed to have developed after the devastation of the plague led to increased interest in death. Works from the following decades and centuries highlighted themes of decay, transience, and mortality in literature and art. One of the earliest visual depictions is a now lost mural from around 1424 in Paris's Cemetery of the Holy Innocents, while one of the most famous is German artist Hans Holbein the Younger's "Dance of Death." The series of woodcuts, published in 1538, depicts people from all stations of life—from pope to peddler—facing their inevitable demise. Perhaps the most common and enduring memento mori works can be found on tombstones. Skeletons, skulls, and hourglasses adorned graves for centuries, even crossing the Atlantic to mark the graves of England's North American colonies to remind the living that their time on Earth was temporary.

A MEMENTO MORI ON THE EXTERIOR OF THE 17TH-CENTURY CHURCH OF THE HOLY TRINITY IN MINSTERLEY, SHROPSHIRE, ENGLAND

MH COUNTRY/ALAMY

medicine for the disease superior or equal in efficacy to flight . . . a multitude . . . deserted their city, their houses, their estates, their kinsfolk, their goods, and went into voluntary exile, or migrated to the country parts, as if God . . . intended the destruction of such alone as remained within the circuit of the walls of the city." When the outbreak reached London, overwhelmed officials opted for mass graves.

Common Burials

The discovery at rural Thornton Abbey is unique: All other English mass graves from the Black Death period are sited in towns. A team of researchers, led by Hugh Willmott of the University of Sheffield, began working at the site in 2013. They excavated a shallow grave and found a mass burial of 48 bodies, including 27 children, wrapped in shrouds and carefully arranged in rows. Researchers believe this placement indicates that the grave was filled over a short time, perhaps several days or weeks.

Two silver pennies and radio-carbon dating of two skeletons have dated the grave to the Black Death era. Testing of the remains also revealed the presence of *Y. pestis*. The findings were published in *Antiquity*, detailing the "catastrophic" impact of the plague on the area. As people fell ill, Willmott believes they went to a hospital at Thornton Abbey hoping to receive a "proper Christian death" and burial in a churchyard.

The number of dead overwhelmed Thornton Abbey. Rather than give each person an individual burial, the local residents did the best they could with what they had.

The mass grave, Willmott wrote, "represents a catastrophic failure of the established system of dealing with the dead, presumably due to the overwhelming numbers needing to be interred and the scarcity of the living to perform these tasks."

Al-Jazari, Medieval Master of Robotics

Born in modern-day Turkey, Ismail al-Jazari dazzled his rulers with pumps and clocks, a fabulous automaton that played the flute, and a machine regarded as the first ever programmable robot.

Genius in an Age of Invention

762

The Abbasids found the city of Baghdad, where the House of Wisdom is later established to investigate and disseminate learning.

800s

In Persia, the Banu Musa Brothers publish their *Book of Ingenious Devices*, inspired by machines invented by ancient authors.

1136

Ismail al-Jazari, son of a craftsman, is born in Diyarbakir (Turkey), during a time of Artuqid rule.

1181

Al-Jazari begins serving the Artuqids as chief engineer. He will later be encouraged by the king to detail his inventions in a book.

1206

Al-Jazari presents his *Book of Knowledge* to the Artuqid king and dies later that same year.

Fountains that could be programmed to switch on and off. A model of an Indian mahout (driver) who struck the half hour on his elephant's head. Automatons in the form of servants that could offer guests a towel.

These are just some of the marvelous inventions of the 12th-century Muslim inventor Ismail al-Jazari, who laid the groundwork for modern engineering, hydraulics, and even robotics. While some of his lavish and colorful creations were made as novelty playthings for the very wealthy, al-Jazari also made practical machines that helped normal people, including water-drawing devices that were used by farmers for centuries.

A Passion for Inventing

Badi al-Zaman Abu al-Izz Ismail ibn al-Razzaz al-Jazari was born in 1136 in Diyarbakir in what is today central-southern Turkey. The son of a humble craftsman, he was born in a time of political turmoil, a result of local power struggles as well as the effects of the Crusades.

Al-Jazari served as an engineer in the service of the regional rulers, the Artuqids. This dynasty had once expanded its empire into Syria. In the course of al-Jazari's lifetime, however, Artuqid power came under the sway of the more powerful neighboring Zangid dynasty, and later still by the successors of the Muslim hero, Saladin.

Despite the upheaval of the Crusades, and the turbulent relations between different Muslim powers, life for the brilliant engineer was peacefully spent serving several Artuqid kings, for whom he designed more than a hundred ingenious devices. Unlike other practical inventors of the period, who left little record of their work, al-Jazari had a passion for documenting his work and explaining how he built his incredible machines.

In 1206, drawing on a quarter of a century of prodigious output, he gave the world a catalog of his "matchless machines," which is known today as *The Book of Knowledge of Ingenious Mechanical Devices*. Al-Jazari included meticulous diagrams and colorful illustrations to show how all the pieces fit together. Several incomplete copies of his work have survived, including one held by the Topkapi Sarayi Museum in Istanbul, Turkey, prized for its artistic detail and beauty.

Al-Jazari served several Artuqid kings, for whom he made large numbers of ingenious devices.

A BOWL MADE DURING THE ARTUQID DYNASTY IN THE LATE 12TH CENTURY
INTERFOTO/AGE FOTOSTOCK

SOUNDING THE ALARM

Al-Jazari described his playful "alarm clock," designed to deliver a gentle tone to wake someone from a nap:

A handsome boat from which can be told the passage of an hour: In the boat is a man, leaning on a handsome oar, the blade of which is on the floor of the boat and its upper end in his left hand. In his right hand is a pipe, its end in his mouth. In the floor of the boat is a drilled [aperture] through which the water passes into the boat. The boat fills and submerges in the space of one constant hour. When it has fully submerged, the sailor plays the pipe . . . I made this device so that [a sleeper] will know from the pipe that the boat has sunk, and will wake from his doze at the sound.

A MINIATURE FROM AL-JAZARI'S *BOOK OF KNOWLEDGE* DEPICTING A WATER-POWERED FLAUTIST AUTOMATON. TOPKAPI SARAYI MUSEUM, ISTANBUL

BRIDGEMAN/ACI

Intellectual Inheritance

The Book of Knowledge is the only source of biographical information that exists on al-Jazari. The text exalts him as Badi al-Zaman (unique and unrivaled) and al-Shaykh (learned and worthy), but it also acknowledges the debt he owed to "ancient scholars and wise men."

Al-Jazari's inventions benefited from centuries of innovation and scholarship from previous eras, drawing on science and wisdom from ancient Greek, Indian, Persian, Chinese and other cultures. During the rapid expansion of Islam in the seventh century, Muslim rulers took a deep interest in the knowledge of the lands they conquered. They collected manuscripts and books at the Bayt al-Hikma (House of Wisdom). This institution thrived under the Abbasid caliphs of Baghdad in the eighth and ninth centuries as a library and academy. Along with other centers, it played a fundamental role in the medieval scientific and scholarly advances during the golden age of Islam.

Along with philosophy, medicine, astronomy, and zoology, Muslim mechanical engineering reached exceptional heights at the hands of outstanding figures, including a trio of ninth-century Persian inventors, the Banu Musa brothers. They published many works, but al-Jazari was most likely influenced by their inventions featured in *The Book of Ingenious Devices* (also known as *The Book of Tricks*). Al-Jazari was also influenced by non-Muslim inventors such as the late third-century B.C. Apollonius of Perga, an influential geometrist whom al-Jazari credits in his work.

New Heights

Al-Jazari's intention was not only to build on the legacy of these great

LOOKING INSIDE

COLORFUL DIAGRAMS from *The Book of Knowledge* are not only delightful to the eye but also practical and useful to the mind. Each one served as an instruction manual for how to build the machines and the mechanisms behind their movement. In al-Jazari's famous peacock fountain (near right), water flows from the bird's mouth as tanks raise floats to activate "servants" to produce towels and soap. A drawing of the driver (center) from the elephant clock reveals how the arms should be attached. The inner workings of a water-drawing machine (far right) show how hidden gears drive an animated cow around a vertical shaft, which powers the mechanism that scoops up water.

TOPKAPI SARAYI MUSEUM, ISTANBUL
BRIDGEMAN

inventors but to perfect it. He wrote in his foreword to *The Book of Knowledge:* "I found that some of the earlier scholars and sages had made devices and had described what they had made. They had not considered them completely nor had they followed the correct path for all of them . . . and so wavered between the true and the false."

The machines in al-Jazari's book were both practical and playful, from clocks to automaton vessels dispensing drinks. He designed bloodletting devices, fountains, musical automatons; water-raising machines; and machines for measuring.

One of the most famous of his devices is an enormous water clock that featured an elephant carrying his driver and a tower filled with creatures. Simple water clocks had been used in ancient Egypt and Babylonia, but al-Jazari's intricate invention clearly expresses his ambition to perfect them.

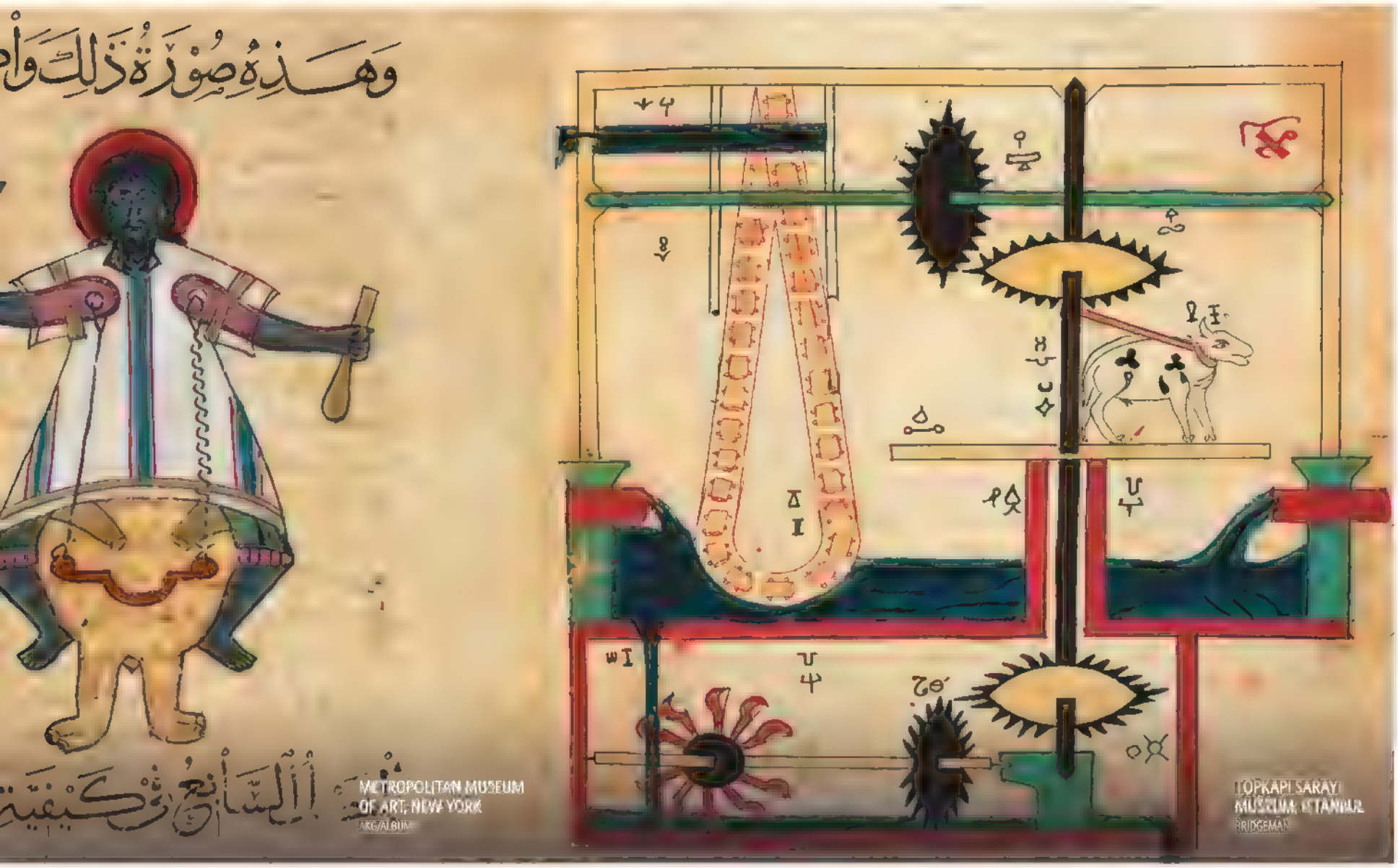
The different creatures that animate every half hour represent different cultures, like the dragons from China and the elephant of India. Every half hour, the internal mechanisms activate: The bird atop the dome whistles, the seat man drops a ball into a dragon's mouth, and the elephant driver strikes the beast's head.

Another of al-Jazari's fantastical contraptions is of special interest to historians of science as it is regarded by many to be the first programmable "robot" in history. Much like a music box, this invention, a boat with four "musicians"—a harpist, a flautist, and two drummers—was designed to play songs to

A COSMOPOLITAN CLOCK

AL-JAZARI'S MOST ICONIC INVENTION is his elephant clock, which continues to delight today. Modern reproductions of the water-driven device can be found at several places in the world, including the Ibn Battuta Mall in Dubai; the Institute for the History of Arab-Islamic Science in Frankfurt, Germany; and the Museum of Horology, Le Locle, Switzerland.

AL-JAZARI'S ELEPHANT CLOCK. REPLICA, 20TH CENTURY
WHA/AGE FOTOSTOCK



entertain. The mechanisms animating the drummers could be programmed to play different beats.

For all their ingenuity, such devices were playthings for the rich. With his courtier hat on, al-Jazari understood the need to dazzle his rich patrons, who would, in turn, dazzle visiting dignitaries with their resident genius's latest wonder. As a craftsman from a modest background, he also knew the needs of the everyday and devised useful gadgets that would lighten the burden of everyday toil. The book describes in detail at least five machines that facilitated drawing water and irrigating, on the farm and at home. Other highly practical machines were also included in his book: a crankshaft that converts linear movement into rotary movement; and a means for the exact calibration of locks and other apertures, among much else.

The humble nature of *The Book of Knowledge* is also reflected in its language. While other inventors deliberately couched their prose in obscure language to limit it to a small elite, al-Jazari took pains to make it accessible to a general reader of the time so that they might build some of his more practical machines. Given that al-Jazari was as much interested in construction processes as in theory and calculations, some researchers have even described his book as a kind of "user's manual."

Awesome Legacy

Al-Jazari died in 1206, the year that he presented the sultan with his *Book of Knowledge*. He is remembered principally for this book, but his realized inventions would play a key role in civic life for many years to come. Among them was a water supply system using gears and hydraulic energy, which was used in the mosques and hospitals of Diyarbakir and Damascus. In some cases, systems modeled on his design remained in use until recent times.

Most of his innovations were centuries ahead of the achievements of European science. His work on conical valves—a key component in hydraulic engineering—was first mentioned in Europe more than two centuries later by Leonardo da Vinci, who was also reportedly fascinated by al-Jazari's automatons.

Today al-Jazari's name inspires awe among science historians. Engineer and technology historian Donald R. Hill, author of a landmark 1974 translation of *The Book of Knowledge*, said the importance of al-Jazari's work "is impossible to over-emphasize." As the father of robotics, he has been described as the "Leonardo da Vinci of the East," a moniker that is in many ways a misnomer. It might be more accurate to describe Leonardo as the "al-Jazari of the West."

—Jorge Elices

Everyone Screamed for Ice Cream

For centuries, no matter the name—flavored ice, sorbet, sherbet, custard, gelato, or ice cream—these frozen treats have stayed just as sweet for centuries.

Modern refrigeration might seem absolutely required for creating and enjoying frozen desserts, but indulging in cold treats goes back thousands of years. These prized indulgences were enjoyed by people living all over the ancient world—from China to Mesopotamia.

As early as 4,000 years ago, Chinese people enjoyed a kind of frozen syrup. Centuries later around 400 B.C., *sharbat* was a popular treat in the Persian Empire. This cold drink featured syrups made from cherries, quinces, and pomegranates that were then cooled with snow. The modern words "sherbet," "sorbet," and "syrup" can trace their linguistic recipe origins back to sharbat.

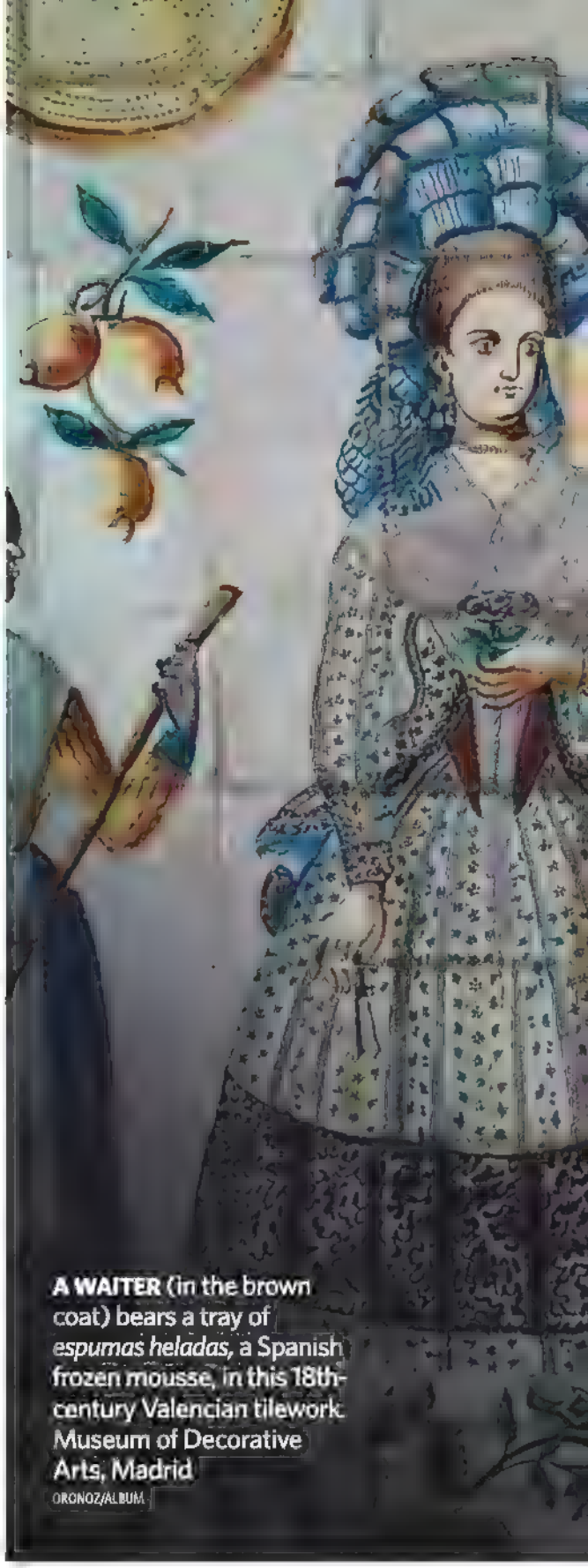
Historic accounts tell of Alexander the Great, who conquered the Persian Empire in 330 B.C., enjoying flavored ices sweetened with honey. The Greeks, and later the Romans, adopted the custom of cooling their drinks. In the early years of the Roman Empire, Emperor Nero was known to indulge in fruit juices mixed with honey and snow at his banquets. Centuries later in the 1290s, Marco Polo returned from China with recipes for flavored ices, some of which included milk.

Important Ingredients

These precursors of modern ice cream were only made possible by procuring and preserving snow and ice from cold, mountainous areas or frozen lakes and rivers. After gathering the cold stuff, handlers would pack it with straw and branches to reduce melting and then transport it down the mountain to urban areas.

There, ice and snow would be stored in icehouses. Different civilizations created them with variations on the same theme: chambers free of heat and light. Deep pits were often used, and the ice would be packed in insulation, often straw or sawdust, to keep out the heat.

Procuring ice was labor-intensive and complex, which made it a highly valuable commodity in antiquity. In the Middle Ages snow was still brought from the mountains to icehouses throughout Europe. By the 17th century, many estates had private icehouses, and by the end of the 18th century large icehouses were being built in towns and cities, and traveling salespeople sold large blocks of ice door to door.

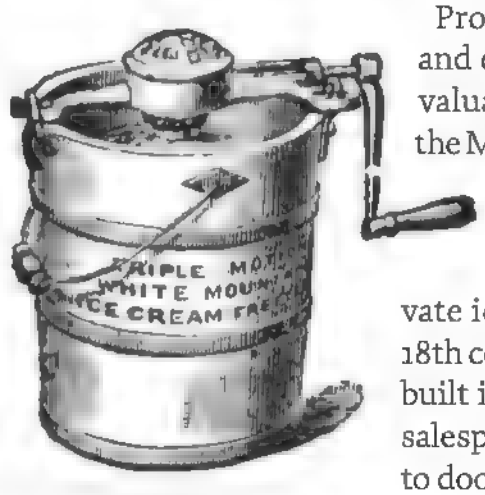


A WAITER (in the brown coat) bears a tray of *espumas heladas*, a Spanish frozen mousse, in this 18th-century Valencian tilework. Museum of Decorative Arts, Madrid

ORONOZ/ALBUM

AMERICAN INGENUITY

IN 1843 New Yorker Nancy M. Johnson patented the first hand-cranked ice-cream maker. After turning the crank for about 45 minutes (which was less time than making it by hand), the ice cream was ready. The machine sold quickly, with improvements in later models, including those by White Mountain.



HAND-CRANKED WHITE MOUNTAIN ICE CREAM FREEZER, 1899

CONOGRAPHIC ARCHIVE/ALAMY

In some cities the ice trade was regulated by the authorities, who set prices and penalties for illegal sale. In Naples there were 43 "ice sellers" in 1807. Rules obliged sellers to supply ice only during the summer.

The Scientific Scoop

The exact timing of incorporating dairy products into frozen desserts has been difficult to pin down. Some food historians believe it first evolved in Asia and was introduced to Europe by Marco Polo, while others vigorously call that a myth. To fully incorporate milk and cream into a smooth frozen treat, cooks used an endothermic process. They

The Presidents' Obsession With Ice Cream

ICE CREAM'S POPULARITY traveled to the Colonies where the leaders of the new nation developed a love affair both with liberty and ice cream. In New York City during summer 1790, George Washington reportedly spent hundreds of dollars on ice cream, while inventories from Mount Vernon reveal that he kept several ice-cream pots at home. Thomas Jefferson developed a taste for ice cream while serving as ambassador to France; when he returned to Monticello, he built his own icehouse so he could have the dessert anytime. Perhaps the presidential name most associated with ice cream is Madison—but it's not President James, it's First Lady Dolley, who first served strawberry ice cream at the White House during her husband's second Inaugural Banquet in 1813.

SORBETTO IN THE STREETS

SORBETTIERA were the street vendors who sold *sorbetto* in Naples. The well-to-do could find their sorbet in cafes, but the lower classes flocked to the popular street vendors in the 18th and 19th centuries. Travelers to Naples often remarked on sorbetto in their scenes of the city's street life. In 1839 Irish author and biographer of Lord Byron, Marguerite Gardiner, Countess of Blessington, wrote: "The gaiety of the streets of Naples at night is unparalleled. . . . The ice-shops are crowded by the *beau monde*, and the humbler portable shops, . . . which are established in the streets, are surrounded by eager applicants for the sorbetto and lemonade."

NEAPOLITAN STREET VENDOR SELLS SORBET IN A 19TH-CENTURY ILLUSTRATION.
BRIDGEMAN/ACI

would place ice-cream ingredients in a metal vessel, which would then be placed inside a bucket filled with ice and salt (saltpeter was also used). Salt lowers the freezing point of ice, which then absorbs energy in order to melt. The ice would "pull" heat from the creamy mixture, which would then solidify.

The first evidence of using this technique in Europe comes from a treatise published in 1550 by Blas de Villafranca, a Spanish doctor residing in Rome. The technique spread throughout Italy, and in 1558 the Neapolitan Giambattista della Porta described it in his work *Magia naturalis (Natural Magic)*: "Since the first thing people want to do at parties is drink wine as cold as ice, especially in the summer, I will teach you how it can not only be cooled but frozen, so it can only be drunk by sipping it. Pour some wine into a jar and add a little water so it freezes more quickly; then add snow in a wooden pot and sprinkle powdered saltpeter over it. Stir the jar in the snow and it will gradually freeze." With his recipe for frozen wine, the method for making *sorbetto* was introduced.

ICE-CREAM COOLER, 18TH CENTURY NATIONAL CERAMIC MUSEUM, NAPLES
BRIDGEMAN/AC

Climate and culture came together in 17th-century Naples to popularize *sorbetto*.

From Naples, climate and culture came together to popularize the sorbetto more than anywhere else in Europe. In 1690 the first book on ***sorbetti*** came out in Naples—the anonymously published *New and Quick Ways to Make All Kinds of Sorbets With Ease*. Judging by the ingredients for its recipes, it was likely used in an aristocratic household. Then came *The Modern Steward* (1692–94) by Antonio Latini, who worked for the Spanish viceroy in Naples and wrote a guide to cooking and household management that included a section on ices.

The first European ice creams are believed to have originated in Italy around this same time. Recipes spread to France in the 17th century, and then to England where they really caught on. The first appearance of the term "ice cream"

TRIPLETS enjoy ice cream in 1920. The popularity of the frozen snack soared in Europe and the United States after the invention of refrigeration.

TRANSCENDENTAL GRAPHICS/GETTY IMAGES

in English occurred in the 1670s. One instance detailed it among a number of elaborate dishes served at the Feast of St. George at Windsor in May 1671.

Ice Cream Crazes

Making ice cream, unlike sorbet, was highly labor-intensive. Ice had to be chipped by hand and packed with rock salt to fill a large tub, into which another pot of cream, milk, sugar and flavoring was placed. The contents were then stirred by hand for several hours until ice cream formed. Often the ice cream was then scooped out and placed into fanciful molds shaped liked fruits and flowers. Because of the expense of making and serving ice cream, the dessert remained unaffordable for most Europeans and was largely enjoyed by royalty.

Sorbetto grew in popularity in large European cities throughout the 18th century. The growing middle classes were discovering the pleasures of frozen sweets in local shops. Along with sorbetti (ices churned smooth during freezing), there were granitas (granular concoctions of fruit and ice), and *sorbetti con crema* (ices with milk added—forerunners of gelato and ice cream). Royal porcelain factories such as Sèvres near Paris produced ice-cream cups and saucers for shops and homes as more modest families joined the sorbetto craze.

The earliest recipe book devoted entirely to making ice cream was *L'Art de bien faire les glaces d'office*, published in France in 1768, whose translated subtitle reads: *True principles for freezing refreshments*. Although the ice-cream craze soon spread to the North American colonies, it was still an expensive luxury in the 18th century, even after the American Revolution. Records kept by a New York merchant show that President George Washington spent approximately $200 for ice cream during the summer of 1790—thousands of dollars today.

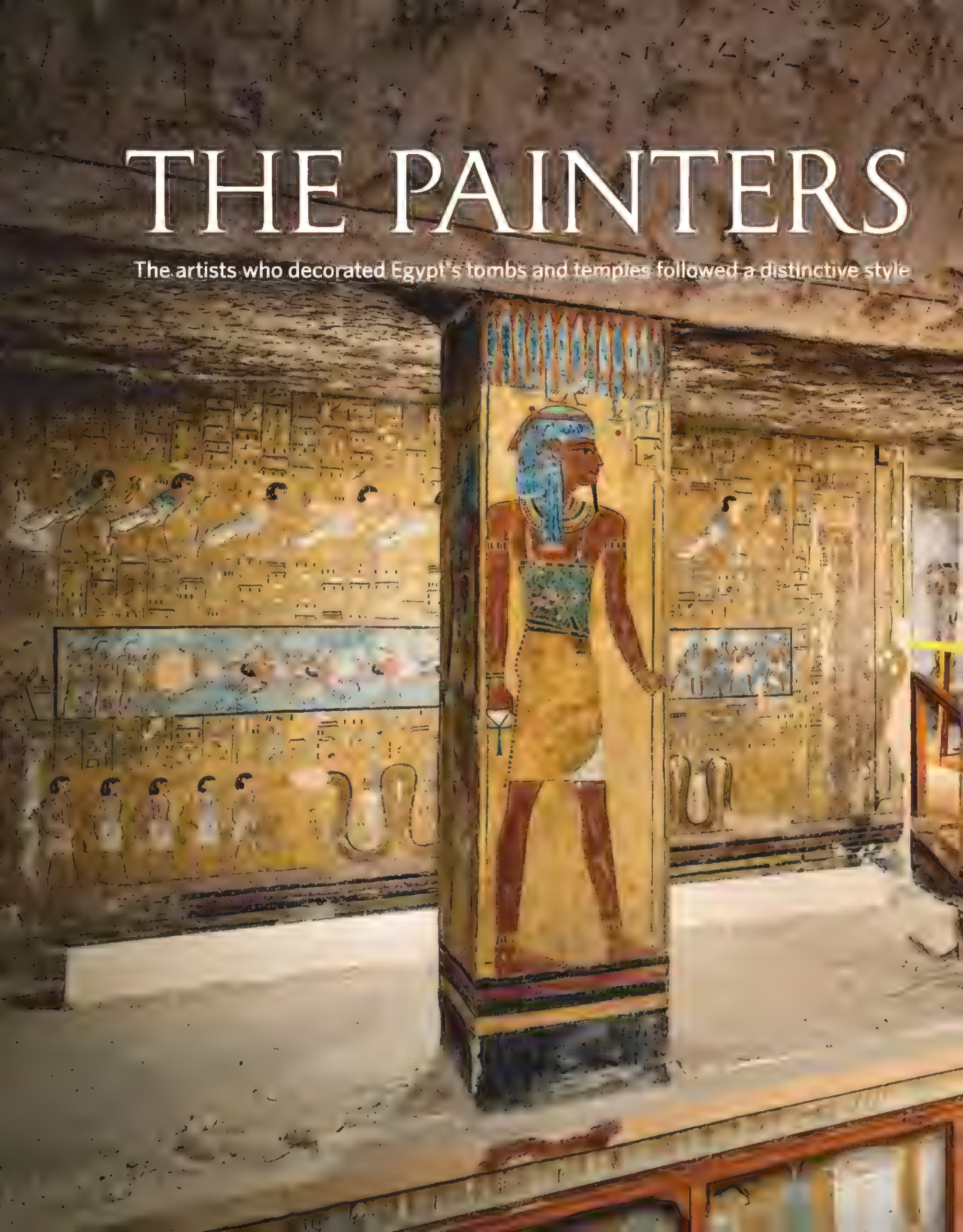
The United States would be the place where ice cream would finally become affordable to the masses. In 1843 New Yorker Nancy M. Johnson invented an ice-cream maker that drastically reduced production time. American firms improved on her design and built new machines that simplified and lowered the costs of ice-cream production.

In 1851 a milkman from Baltimore, Maryland, named Jacob Fussell built the first ice-cream factories and expanded the availability of the product. After the Civil War, ice cream's popularity exploded across the United States. Ice-cream shops and soda fountains arose across the nation as places for people to enjoy this frozen treat that was once reserved for king and queens.

—Alfonso López

THE PAINTERS

The artists who decorated Egypt's tombs and temples followed a distinctive style



MAITE MASCORT

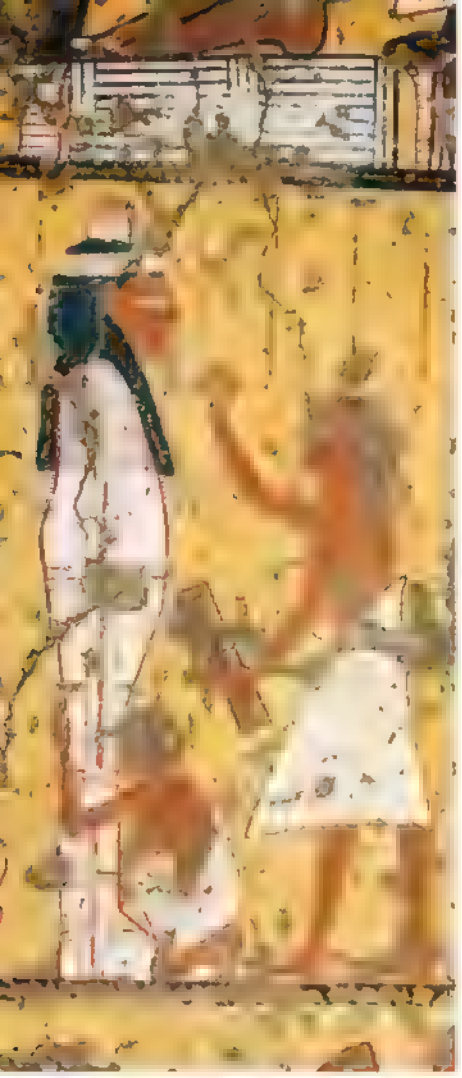
OF EGYPT

forged at the dawn of Egypt's history

ART FOR THE AFTERLIFE

Egyptian rulers lavished funds on the best painters for their tombs. The image shows the second burial chamber intended for the 19th-dynasty queen Tausert, who later ruled as pharaoh in her own right. Scenes on the rear wall are from the Book of Gates, a funerary text about the soul's passage through the underworld.

ARALDO DE LUCA



ARTIST AT WORK
Not all tomb art was for the high born. A detail (above) from the tomb of a sculptor from Deir el Medina dates to the reign of Ramses II (ca 1279-1213 B.C.), and shows a painter decorating a coffin.
LIG/A.BUM

Painters in the Western tradition strive for "originality," stamping a style on their work to ensure their name will be remembered forever. The painters of ancient Egypt could not have been more different: Creators of some of the world's most iconic art, they worked anonymously, continuing a style whose precepts were laid down at the dawn of Egyptian culture in the third millennium B.C.

From its distant origins to the peak of its splendor in the grand tombs of the Valley of the Kings and Queens, Egyptian painting was not created to please a public, but for more transcendent needs. The *ka*, the vital essence of the deceased, needed nourishment in order to survive in the afterlife. To supply it, Egyptians looked to the magic *(heka)* of painting. By representing an object, they believed they could make it a reality, which is why growing wheat, hunting, and fishing were popular subjects.

This idea of art having a function beyond aesthetic pleasure is alien to classical and modern notions of painting. The Egyptian painter was striving to capture a subject not in one moment of happiness or sadness, but for all time, a nameless undertaking, carried out in praise of the cosmic order.

Historians know from hieroglyphics that these anonymous artists were called *sesh qedut*, roughly translated as "scribes of outlines." The office was hereditary, handed down from father to son. Apprentices learned by making copies of earlier works on walls or on ostraca (pieces of stone or sherds). They would sketch out the draft in red, and the master would correct in black.

The application of their skills included the decoration of statues or coffins, as well as more mundane pieces such as furniture and stelae. The most highly regarded task for these craftsmen, however, was decorating temples and tombs. The same themes—life along the Nile, scenes from the afterlife, the pharaoh dispensing justice—recur for centuries, in the same distinctively flat and two-dimensional style. Colors are uniform, and forms are organized in bands similar in appearance to a modern comic strip.

Animals and plants are often depicted with vivid naturalism, while people are usually rendered in a flat, two-dimensional style. The body and head are almost always shown in profile while the eyes and shoulders face forward.

This distinctive style is ancient. It was first codified in the Old Kingdom (2575-2150 B.C.) and endured through the Middle Kingdom (1975-1640 B.C.) and New Kingdom (1539-1075 B.C.) with little disruption. Painters continued to utilize it until the Roman annexation of Egypt in 30 B.C. The style is intertwined with Egyptian ideas of cosmic order, the needs of the eternal soul after death. Its origin story begins with the birth of pharaonic culture itself.

IN BROAD STROKES

TOMB 100
ca 3400 B.C.
Themes from Egypt's oldest painted tomb reflect the painting style that will emerge in the Old Kingdom.

NEFERMAAT'S TOMB
2575-2551 B.C.
Scenes of everyday life and religion adorn this splendid Old Kingdom mastaba (flat-topped tomb).

AMARNA STYLE
ca 1353-1336 B.C.
The radical Akhenaten breaks with the old painting style, which is restored after his death.

NEFERTARI'S TOMB
ca 1255 B.C.
Funerary texts are brought to vivid life in this New Kingdom tomb of Ramses II's beloved wife.

WAR GODDESS
Located in the Valley of the Kings, the tomb art of the 19th-dynasty pharaoh Seti I demonstrates the degree of perfection achieved by painters in Egypt during this dynasty. On the pillar, Neith, a very ancient goddess of war, is depicted standing beside the pharaoh.
ARALDO DE LUCA

GEESE DEPICTED ON THE FRIEZE OF THE CHAPEL OF ITET IN THE OLD KINGDOM TOMB OF ITET'S HUSBAND, PRINCE NEFERMAAT, 2575-2551 B.C. SCHOLARS ARE CURRENTLY DIVIDED AS TO THE AUTHENTICITY OF THE WORK.
ARALDO DE LUCA

WORKING TOGETHER, A HUSBAND AND WIFE HARVEST GRAIN IN THE FIELDS OF THE AFTERLIFE IN A MURAL FROM THE ARTISAN SENNEDJEM'S TOMB, WHICH DATES TO THE 19TH DYNASTY (1292-1190 B.C.).

ARALDO DE LUCA

Iconic Origins

Distinctive red figures on a yellow background adorn Tomb 100 at the site of the ancient royal city of Hierakonpolis. Painted around 3400 B.C., these hunting and battle scenes are the earliest known tomb paintings in Egypt. Some 200 years later, Egypt was united for the first time under King Narmer. Following his reign, Egypt's 1st dynasty was established, and soon after an emergence of the new artistic style.

Although the themes in Tomb 100—a king subjugating people, animals, a procession of boats—would dominate painting for centuries, the emerging style adopted a much more tightly organized composition, which reflected *m'aat*, a complex spiritual concept that embraced order, harmony, balance, truth, justice, and morality. Central to m'aat was the organizing principle of duality. Day is separated from night, female from male, and earth from heaven, a symmetry that is replicated in most Egyptian painting.

During the Old Kingdom, artists began using a grid system to create their works. Mapping their work onto it ensured correct figure positioning and proportions. At this time, artists also began using a technique called sunken relief, in which outlines would be etched into plaster and then painted, a technique that provided the flatness of the artwork with a degree of light and shade. Many fine specimens of their works were found in the royal tombs of Saqqara, near the ancient capital of Memphis.

As the age of the pyramids drew to a close, Egypt underwent a period of transition that lasted until around 1975 B.C., the beginning of what became known as the Middle Kingdom. The traditional painting style flourished and slightly evolved to feature cleaner, simpler designs.

Egypt's New Kingdom, starting around 1539 B.C., was a time of expansion and imperialism. Massive royal monuments, palaces, and temples provided artists with enormous new "canvases" to feature their work.

During this period of growth, Egypt experienced a religious and artistic revolution led by Pharaoh Akhenaten, who replaced the old pantheon with worship of one god: Aten, the sun disk. Akhenaten moved the capital to Amarna, and the art produced during his reign was dubbed "Amarna style." People were represented with elongated heads, luscious lips, protruding bellies, and thin legs.

After Akhenaten's death, his new theology and art were abandoned; artists quickly returned to the traditional style and the old gods. Although Tutankhamun reigned for only a few years after his father Akhenaten's death, the rapidity with which the old gods, and the old style, had been restored is evident in the art of his famous tomb.

Once reestablished, the traditional style became the vehicle for proclaiming Egypt's imperial supremacy. Egypt reached new heights with the reigns of Seti I and Ramses II. Tombs from this era glow a rich gold, a color associated with the incorruptible flesh of the gods. The New Kingdom tombs of Seti I and Queen Nefertari feature myriad depictions of the afterlife. Encounters between the deceased and the gods are revealed in stunning color.

Egypt's iconic art would last well into the Ptolemaic Period, after Alexander the Great conquered Egypt in 332 B.C. The leaders that followed, including Cleopatra the Great, embraced Egypt's glorious past, depicting themselves in the same style as the pharaohs of centuries past.

EGYPTOLOGIST **MAITE MASCORT** HAS WRITTEN EXTENSIVELY ON HER RESEARCH AT THE ANCIENT EGYPTIAN CITY OF OXYRHYNCHUS.

PAINTER'S PALETTE

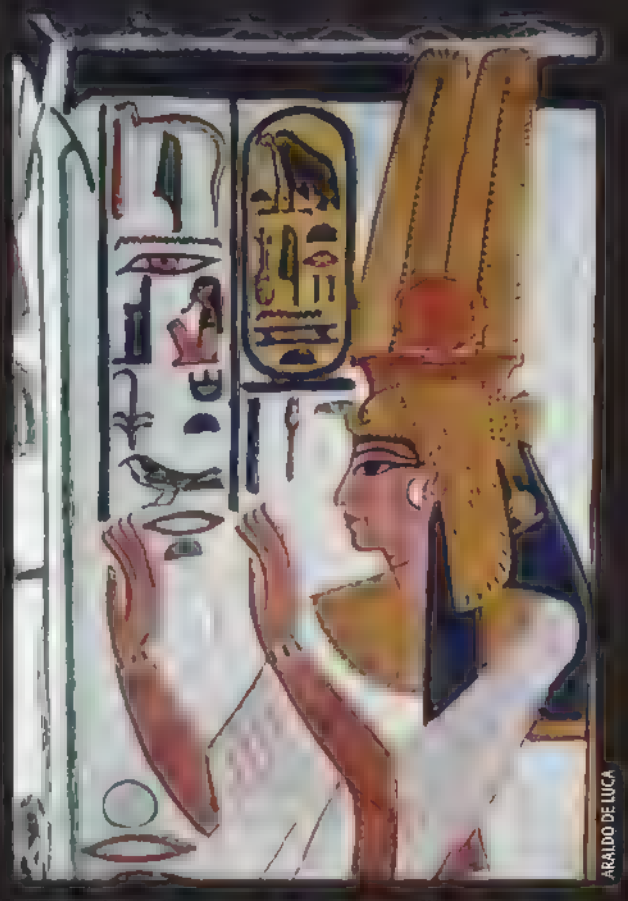
An ivory palette (below), dated to around 1350 B.C., has spaces for different pigments and bears the name of the 18th-dynasty pharaoh Amenhotep III.

ALBUM

In a side chamber the queen is depicted making offerings to the gods Osiris and Atum who are both seated on thrones.
Nefertari appears alongside various divinities in vivid panels that flank a ramp leading down into the tomb.
Playing *senet* (a popular board game), the queen appears in different scenes in the colorful antechamber.
On the pillars the queen is shown surrounded by gods and symbols of resurrection, such as the *djed*, representing stability.
Fearsome guardians appear along the walls in this lower chamber. Nefertari must pass them to reach the afterlife.
ILLUSTRATION: 4D NEWS

Tomb Art for a Beloved Queen

THE TOMB OF NEFERTARI, the Great Royal Wife of Ramses II, stands in the Valley of the Queens. Built some 3,250 years ago, it has been dubbed the "Egyptian Sistine Chapel." The tomb is remarkable for its magnificent illustrative decoration and contains thousands of square feet of paintings that depict the magical rituals necessary to reach the afterlife. Ramses seems to have been particularly close to Nefertari, whom the painters have rendered with careful detail, often using naturalistic techniques such as shading. Discovered in 1904, the tomb deteriorated rapidly and had to be restored in the 1980s. Visitor access has been restricted to protect it from damage, but people can still enjoy the tomb without traveling to Egypt. Detailed 3-D scans of Nefertari's tomb have digitally preserved its magnificence and have been used to create a virtual reality tour that can be downloaded and viewed at home.



NEFERTARI'S FACE IS RENDERED WITH SHADING TO ADD DEPTH TO THE FIGURE, AN UNUSUAL PRACTICE IN EGYPTIAN PAINTING.

TRACES OF PIGMENTS REMAIN IN THESE FIRST-CENTURY A.D. VESSELS FROM HAWARA, EGYPT. BRITISH MUSEUM, LONDON

BRITISH MUSEUM/SCALA, FLORENCE

In Living Color

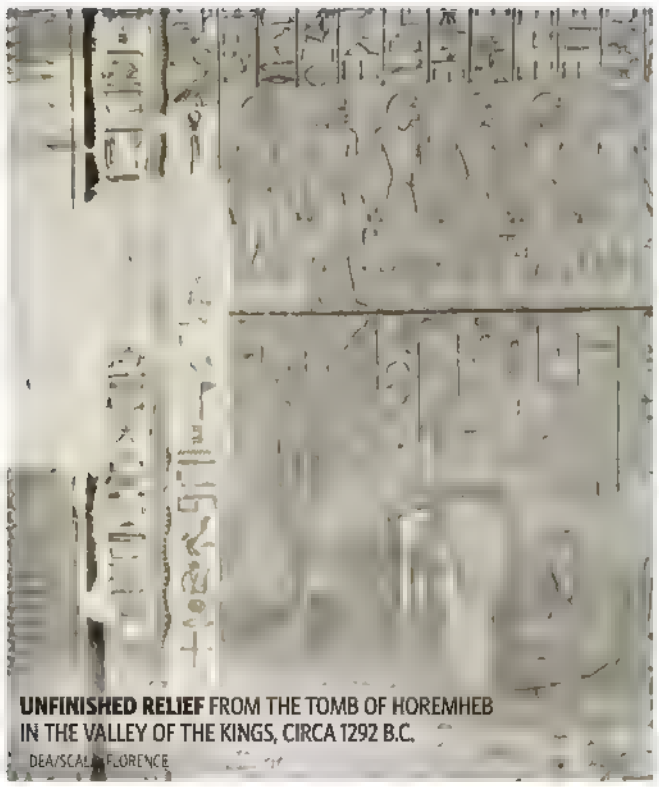
EGYPTIAN ARTISTS made their paints from the materials that surrounded them. Black was obtained from charcoal, soot, or burned bones. The color was associated both with death and life—partly, perhaps, because it was the color of the life-giving Nile silt. Blues symbolized fertility and birth, and greens were used for the afterlife; both were made from copper oxides. Yellows (the sun) and reds (symbolizing both fire or danger and destruction) were obtained from ocher, which was abundant in the desert.

These substances would be ground into powder, then mixed with water and a little vegetable gum. Egg albumin and wax served as a fixative. Painters could decorate stucco, papyrus, and wood having treated the surface beforehand with a layer of mud or gypsum plaster. To apply the paint, they used a simple calamus, a reed like that used by the scribes, but with the tip clipped so as to retain the paint.

Painters belonged to workshops arranged according to a hierarchy. No one artist would ever claim authorship of a work as complex and prestigious as a tomb painting; it was a team effort. One artist would design the overall composition; others would then carve the reliefs. Craftsmen would add details before color was applied in the last stage of the artistic process.

HUNTING IN THE AFTERLIFE. A SCENE DEPICTED ON A WALL PAINTING FROM THE THEBAN TOMB OF THE 18TH-DYNASTY HIGH OFFICIAL NEBAMUN, WHO LIVED AROUND 1350 B.C.

BRITISH MUSEUM/SCALA, FLORENCE



UNFINISHED RELIEF FROM THE TOMB OF HOREMHEB IN THE VALLEY OF THE KINGS, CIRCA 1292 B.C.
DEA/SCALA, FLORENCE

Life on the Grid

STUDIES OF TOMB ART at the necropolis of Saqqara revealed not only the beauty but also the ingenuity of Egyptian artists in the Old Kingdom. In these early tombs, artisans would prepare the "canvas" by applying a smooth layer of plaster before the artists would begin creating their paintings. The uniformity and style struck 19th-century Egyptologist Karl Richard Lepsius, who was the first to notice that these tomb paintings depicting human figures were designed using a grid, a tradition that continued throughout Egypt's long history.

Archaeologists have found the earliest use of the grid in the Third Dynasty, during Egypt's early dynastic era (ca 2950-2575 B.C.). The grid helped ensure that the figures and objects would be rendered consistently with little variation in proportion and positioning. Artists typically created a map with 18 rows of squares. A smaller master document would be sketched, and then artists would map the work onto the larger surface.

Some tombs, such as Pharaoh Horemheb's at Saqqara (built ca 1332-1319 B.C.), feature splendid finished works as well as unfinished paintings. These "works in progress" have given scholars valuable insight into the artistic process and the many steps, revisions, and contributions that went into creating the spectacular finished pieces.

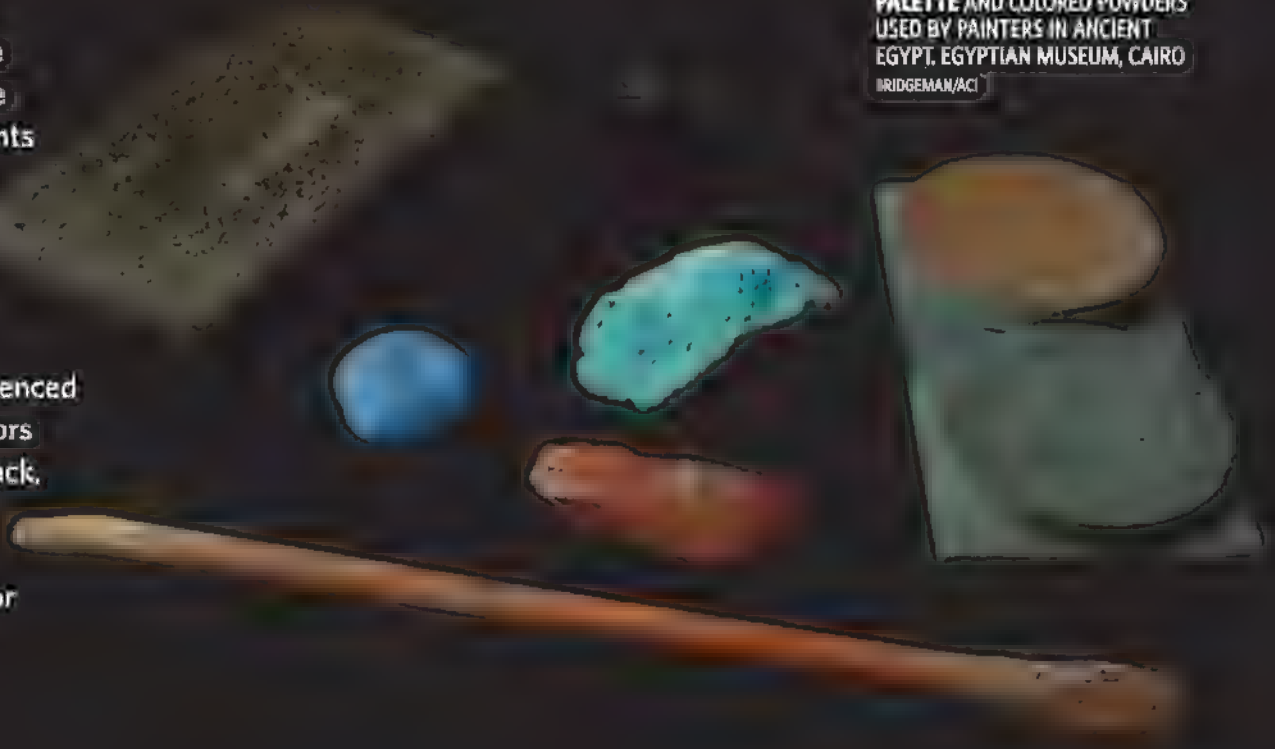
THE ARTISTIC PROCESS IS REVEALED IN WORKS IN PROGRESS FROM THE TOMB OF HOREMHEB, SAQQARA. BUILT CIRCA 1332-1319 B.C.
W. FORMAN/BRIDGEMAN/AI

Egyptian artisans prepare the walls of a tomb for decoration. Plaster is applied and smoothed (left), as pigments are prepared (lower right). After the plaster has dried, grids are mapped on the wall, and then figures are sketched following a master design.

HERBERT M. HERGET/BRIDGEMAN/ACI

PIGMENTS AND COLORS

Egyptian artisans used heavy stone bases, like the block of basalt in the image, to crush and mix the pigments and obtain the different colors used to paint. The majority of pigments were derived from minerals. The choice of colors depended on the available materials and was sometimes influenced by religious considerations. Six colors formed the basic palette: white, black, red, yellow, green, and blue. Among the minerals shown in the image is ocher, from which the color red was derived.



PALETTE AND COLORED POWDERS USED BY PAINTERS IN ANCIENT EGYPT. EGYPTIAN MUSEUM, CAIRO

BRIDGEMAN/ACI

AKHENATEN OFFERS A SACRIFICE TO ATEN ON A RELIEF FROM AMARNA, EGYPT, CIRCA 1330 B.C.
ERICH LESSING/ALBUM

Artistic Revolution

AKHENATEN disrupted traditional artistic style when he replaced Amun, the principal god of Egypt, with the solar deity Aten during his reign between 1353 and 1336 B.C. Unusual for an Egyptian god, Aten had no human form and was represented as the solar disk. In a further break with tradition, Akhenaten founded a new capital, Akhetaten, on a site today called Tell el Amarna.

This religious revolution altered all orders of society, including art. As part of the new "Amarna style" (as it came to be known), representation of the human figure changed radically. In contrast to the traditional style, the pharaoh was represented with skinny arms and legs, a plump belly, and an elongated head. Depictions of the pharaoh and his family adhere to this new style, which is more languid and fluid than the iconic Egyptian style of dynasties past.

Archaeologists have had to piece together details of Akhenaten's reign because his name was struck from history and his images desecrated after his death. Tutankhamun, Akhenaten's son, was named Tutankh*aten* (image of Aten) at birth. His name was later changed to Tutankh*amun* (image of Amun), which shows how quickly Egypt restored Amun to supremacy. This is also reflected in the traditional art and iconography discovered in Tutankhamun's famous tomb.

SCALA, FLORENCE

DEA/SCALA, FLORENCE

REAL LIFE

Artifacts from the Amarna palace reveal marked contrast to the stiffness of traditional royal portraits. Two little princesses (above) chat animatedly amid colorful carpets and cushions. In a relief from Amarna (left), Queen Nefertiti embraces and kisses her eldest daughter, Princess Meritaten, as both are blessed by the rays of the god Aten. Realism abounds in a fragment (right) of painted plaster floor, showing ducks among lotuses and papyri. Above: Ashmolean Museum, Oxford; Left: Brooklyn Museum, New York; Right: Egyptian Museum, Cairo

ERICH LESSING/ALBUM

THE HANGING GARDENS OF BABYLON

MYSTERY OF THE MISSING WONDER

WHERE DID THEIR GARDEN GROW?

Reconstructed monuments at the site of Babylon near Baghdad, Iraq, rise behind the ruins of the city complex built in the sixth century B.C. by King Nebuchadrezzar II. The location of the city's Hanging Gardens have, so far, eluded archaeologists. Below: A Babylonian seal depicting bulls and trees dates to circa 1595-1200 B.C. Louvre, Paris

BABYLON: SERGEY MAYOROV/GETTY IMAGES **SEAL:** ERICH LESSING/ALBUM

The site of the Hanging Gardens of Babylon has eluded historians for centuries. Scholarly sleuthing has now thrown up a startling new theory as to where the most mysterious of the Seven Wonders of the Ancient World was located.

J. L. MONTERO FENOLLÓS

Around 225 B.C. a Greek engineer, Philo, produced a list of seven *temata*—"things to be seen"—that are better known today as the Seven Wonders of the Ancient World: the Pyramids at Giza; the Statue of Zeus at Olympia; the Temple of Artemis at Ephesus; the Mausoleum at Halicarnassus; the Colossus of Rhodes; the Pharos of Alexandria; and, most mysterious of all, the Hanging Gardens of Babylon.

Many revisions of Philo's list followed, and other sites were added and removed according to the tastes of the times. But the Philo seven have become canonical, a snapshot of the monuments whose size and engineering prowess awed the classical mind.

Only the Pyramids at Giza (built in the mid third millennium B.C.) remains intact today. Although five of the others have disappeared, or are in ruins, enough documentary and archaeological evidence is available to confirm that they once stood proud, and are not the product of hearsay or legend.

However, the Hanging Gardens of Babylon, held by tradition to be the work of Babylon's mighty King Nebuchadrezzar II (r. 605–561 B.C.), is the list's great enigma. No clue of such gardens has come to light in ruins, or in any reference in Babylonian sources. The hunt for the gardens is one of the most tantalizing quests in Mesopotamian scholarship, and archaeologists are still puzzling out where such gardens may have been located in Babylon, or what was so special about them. They are still debating what the term "hanging" might mean, what they might have looked like, how they were irrigated—in short, whether they even existed at all.

The Elusive Gardens

Apart from Babylon, all the monuments on Philo's bucket list lie in or near the eastern Mediterranean, well within the Hellenist sphere of influence. The Hanging Gardens, however, are an eastern outlier, "a long journey to the land of the Persians on the far side of the Euphrates."

When Philo wrote those words, Babylon, and the Persians, had been subdued a century before, by Alexander the Great, who had died in Babylon in 323 B.C. But despite the expansion of Greek culture eastward into Central Asia with Alexander's armies, Babylon and its famed monuments would have struck Philo's readers as highly exotic and remote.

The ingenious Hanging Gardens, Philo writes, were laid out on a large platform of palm beams raised up on stone columns. This trellis of palm beams was covered with a thick layer of soil and planted with all kinds of trees and flowers, a "labor of cultivation suspended above the heads of the spectators."

GLAZED BRICKS FROM THE THRONE ROOM OF NEBUCHADREZZAR'S PALACE IN BABYLON MUSEUM OF THE ANCIENT NEAR EAST (PART OF THE PERGAMON MUSEUM), BERLIN
GRANGER/AC

CLUES TO THE MISSING GARDENS

LATE 5TH CENT. B.C.
Herodotus describes Babylon in his *Histories* but makes no mention of a monument identifiable as the Hanging Gardens.

LATE 4TH CENT. B.C.
Accounts by Callisthenes and Cleitarchus, who lived in the time of Alexander the Great, will form the basis for future accounts of Babylon's Hanging Gardens.

EARTHLY PARADISE
Gardens were an expression of regal power in Mesopotamia. This seventh-century B.C. bas-relief, from the palace of the Assyrian king Sennacherib in Nineveh, shows figures, including a harpist, in the king's garden. British Museum, London.
ERICH LESSING/ART RE

CA 290 B.C.
Berossus, a Babylonian-born scholar, describes how the Hanging Gardens were built to remind Nebuchadrezzar II's queen of her native Persia.

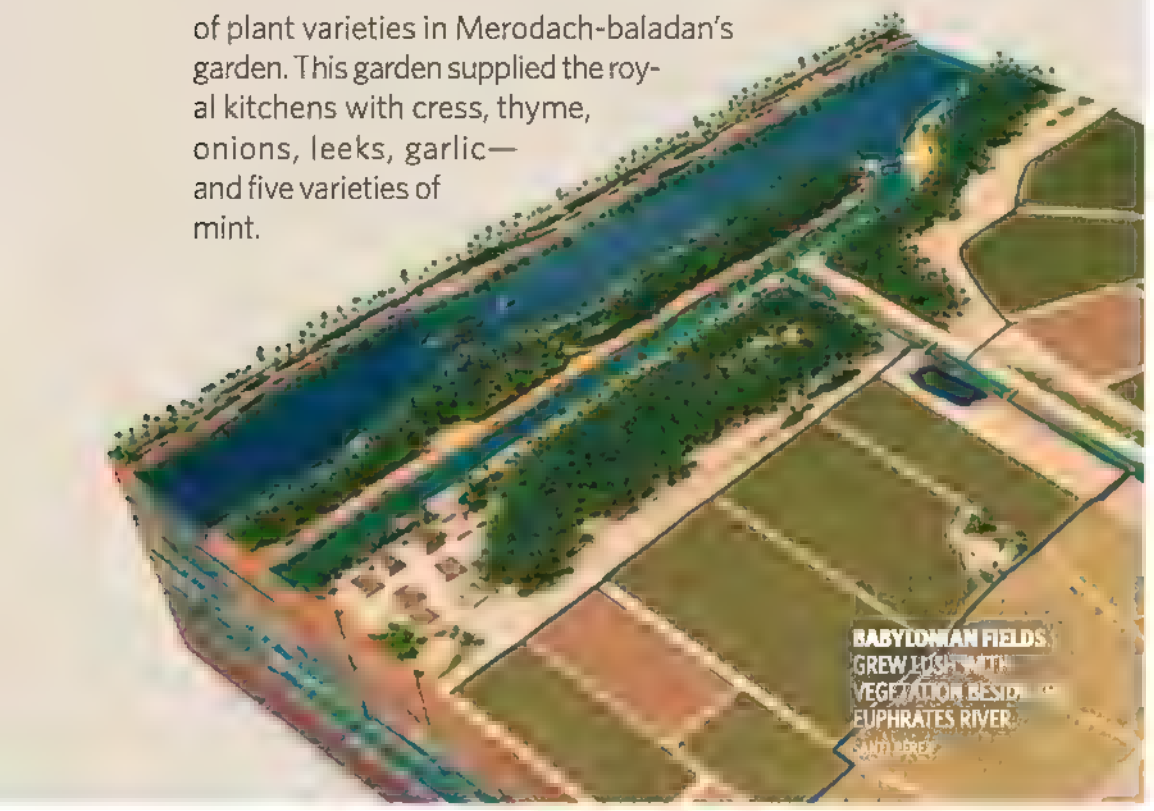
CA 225 B.C.
Philo details the variety and engineering splendor of the Hanging Gardens as part of his list of the Seven Wonders of the World.

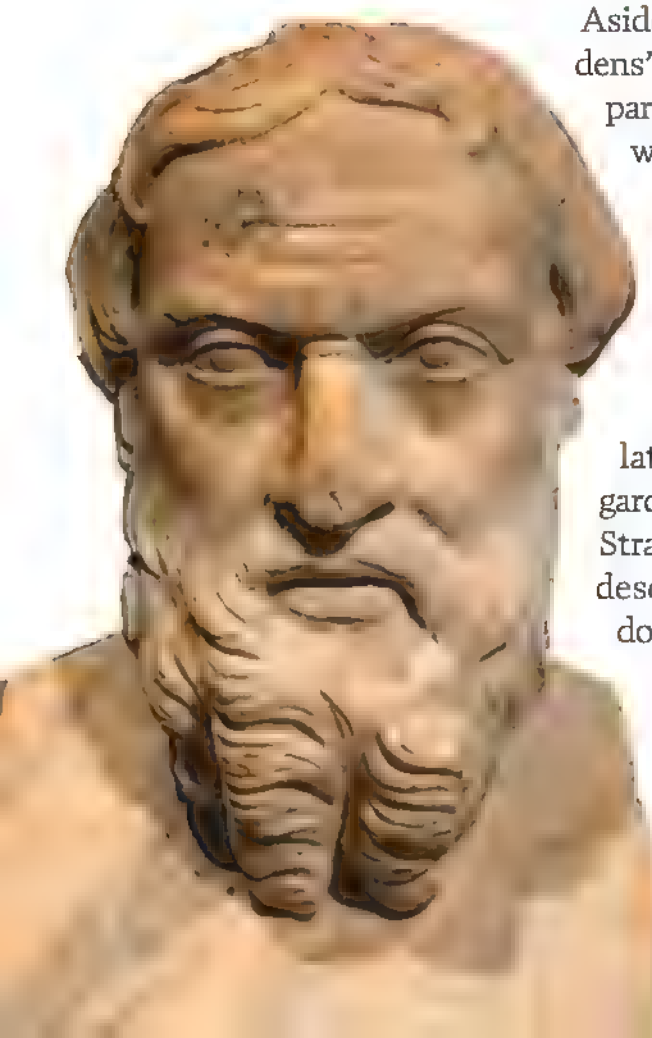
1ST CENT. B.C.
Along with other Greco-Roman authors, Diodorus Siculus describes the Hanging Gardens in his *Bibliotheca historica*.

1ST CENT. A.D.
Jewish historian Josephus writes that the gardens are located near Babylon's palace, a clue that will later inspire archaeologists.

By the Waters of Babylon

ALTHOUGH historians have never found hanging gardens in Babylon, the city was famed for its managed vegetation, such as that created by Babylonian king Merodach-baladan II, who reigned in the late eighth century B.C. His power is attested to in the Bible: The prophet Isaiah warns King Hezekiah that Merodach-baladan's friendly overtures will not last, and Jerusalem will one day be sacked by Babylon (Isaiah 39:5-6). The ability to sustain gardens in a semiarid region required irrigation, a technology that projected great wealth. A cuneiform tablet held in the British Museum lists the dozens of plant varieties in Merodach-baladan's garden. This garden supplied the royal kitchens with cress, thyme, onions, leeks, garlic—and five varieties of mint.





HERODOTUS MADE NO MENTION OF HANGING GARDENS IN BABYLON IN HIS *HISTORIES* (WRITTEN IN THE FIFTH CENTURY B.C.). MARBLE BUST, SECOND CENTURY B.C.
A. AMY/AC.

Aside from its hanging appearance, the gardens' wondrous nature lay, according to Philo, partly in their variety: "All kinds of flowers, whatever is the most delightful, agreeable and pleasant to the eyes, is there." Their system of irrigation also inspired wonder: "Water, collected on high in numerous ample containers, reaches the whole garden."

Historians can draw on a wealth of later classical writers who reference the gardens. The first-century B.C. geographer Strabo and historian Diodorus Siculus both described the gardens as a "wonder." Diodorus, a Greek author from Sicily, left one of the most detailed descriptions of the gardens as part of his monumental 40-volume history of the world, *Bibliotheca historica*. Like Philo, he detailed an elaborate system of supporting "beams": These consisted of "a layer of reeds laid in great quantities of bitumen. Over this is laid two courses of baked brick, bonded by cement and as a third layer a covering of lead, to the end that the moisture from the soil might not penetrate beneath." These layers, according to Diodorus, rose in ascending tiers. They were "thickly planted with trees of every kind that, by their great size or other charm, could give pleasure to the beholder," and were irrigated "by machines raising the water in great abundance from the river."

Earliest Accounts

After much puzzling over Philo's, Diodorus's, and other first-century B.C. accounts of Babylon and its monuments, historians have traced the earliest written sources back to Greek scholars working during and just after the reign of Alexander the Great. Diodorus and Strabo, for example, both drew on accounts of Babylon from fourth-century B.C. writers such as Callisthenes, Alexander's court historian and great-nephew of the philosopher Aristotle. Scholars believe that the passage in Diodorus's *Bibliotheca historica* that describes the Hanging Gardens is derived from a work by a biographer of Alexander the Great, Cleitarchus, who was writing in the late fourth century B.C. His work has not survived but is known through allusions by other authors. The biography was a colorful and gossipy account of Alexander's age.

Another important source of information on the gardens was written by a Babylonian priest named Berossus who lived in the early third century B.C. (soon after the time of Cleitarchus, and several decades before Philo). Judging by other accounts of his lost writings, Berossus seems to have introduced details about the gardens that inspired artists for centuries afterward, writing of high stone terraces lined with trees and flowers. Berossus also wrote that King Nebuchadrezzar II constructed the gardens in Babylon in honor of his wife, Amytis of Media, who longed for the lush mountain landscape of her native Persia.

This romantic story has helped fix the gardens in the popular imagination. But historians are faced with a problem: All sources that

THE PALACE GATE

The 1980s reconstruction of the Southern Palace of Babylon stands near where German archaeologist Koldewey discovered in the early 1900s what he believed to be a structure related to the Hanging Gardens.

DION LEFELDT REZAE/GETTY IMAGES

NEBUCHADREZZAR II ASCENDS THE HANGING GARDENS OF BABYLON IN THIS 20TH-CENTURY ILLUSTRATION, ALSO FEATURING THE ISHTAR GATE.
BRIDGEMAN/ACI

BABYLON REVEALED

During his excavation of Babylon, German archaeologist Robert Koldewey (below) believed he had found the superstructure of the Hanging Gardens. Experts now believe it was a storeroom.
BPK/SCALA FLORENCE

reference a Babylonian garden remarkable for being suspended or tiered date from the fourth century B.C. at the earliest. The Greek historian Herodotus, writing in the fifth century B.C.—only a century after the time of Nebuchadrezzar—makes no mention of these remarkable gardens when describing Babylon in his *Histories*. Further dashing hopes that documentary evidence would shed light on the gardens, the texts that have been discovered from the time of Nebuchadrezzar's reign contain no mention at all of any elevated gardens in the city.

Monumental Confusion

The first-century A.D. Roman Jewish historian Josephus wrote that the gardens lay within Babylon's main palace. During the first excavations of the ruins of Babylon, directed by the German archaeologist Robert Koldewey between 1899 and 1917, a robust, arched structure was unearthed in the northeast corner of the Southern Palace.

Koldewey believed that this was the very structure that had supported the famous gardens. It was made of carved stone, making it more resistant to moisture than mud brick. Its extremely thick walls would have been perfect for supporting the heavy superstructure. In addition, there was evidence of wells, which Koldewey assumed had formed part of the gardens' irrigation system.

Today, however, most scholars agree that the building was probably a warehouse. Several storage jars were excavated from the site, but the strongest evidence is a cuneiform tablet unearthed there that dates to the time of Nebuchadrezzar II. The record contains details about the distribution of sesame oil, grain, dates, spices, and high-ranking captives.

Koldewey's excavation is most famous for revealing the foundations of a wondrous structure that really did exist: Babylon's ziggurat, or stepped tower. A decade later, while British archaeologist Leonard Woolley was excavating the ancient Sumerian city of Ur to the southeast of Babylon, he noted regularly spaced holes in the brickwork of the ziggurat there. Might these be evidence of some kind of drainage or irrigation system supplying gardens rising up the face of the Ziggurat of Ur? Perhaps this kind of system, Woolley speculated, was later used to design the Hanging Gardens in Babylon.

Spurred, perhaps, by the lively public interest such a theory would awaken, Woolley embraced the theory. But archaeologists largely agree that his sober, initial assessment was correct: The holes were bored to enable the even drying of the brickwork during its construction.

Faced with this lack of documentary and archaeological evidence, some experts have opted for a radical reframing of the quest for the Hanging Gardens: What if they were not in Babylon at all? This wonder of the world could well be located in another city entirely.

This hypothesis is not as radical as it may appear at first: Greco-Roman sources that reference the Hanging Gardens tended to present historical detail interwoven with myth and legend, and their recounting of the history of great Mesopotamian civilizations often confused Assyria and Babylonia. Diodorus, for example, places Nineveh, the capital of the Assyrian

DRAMATIC ENTRANCE

Photographed in the early 20th century, the walls of Babylon stretch out before the camera. Reliefs of animals, visible on the walls, would once have been decorated with glazed bricks.

GRANGER/ACI

BABYLONIAN OASIS
With its terracing crammed with trees and vegetation, this artistic imagining of Babylon's Hanging Gardens takes inspiration from the writings of various classical authors. Later theories proposed that the gardens ascended the tiers of the stepped Etemenanki ziggurat, seen in the background. Most modern historians, however, consider that to have been structurally unfeasible.

3D GRAPHIC KA › JACOB

A Garden's Glory

FROM THE PYRAMIDS that still stand at Giza to the Colossus that once towered over Rhodes, nearly all the Seven Wonders of the Ancient World are notable for their sheer size. Although the Hanging Gardens do not seem to fit the category of a massive structure, they reflect a time-honored fascination with lush gardens. Historians believe that in Mesopotamia, parks were first cultivated to please smell, sight, and taste. Jews in Babylonian captivity in the sixth century B.C. may have absorbed local stories of Dilmun, a paradisiacal garden that may have inspired the biblical Garden of Eden. Of the four headwaters that emerge from Eden's river, according to Genesis, two are identified as the Tigris and the Euphrates, the lifeblood of Babylonia.

A COLORIZED ILLUSTRATION SHOWING A FANCIFUL RECONSTRUCTION OF THE HANGING GARDENS OF BABYLON ASCENDING IN TIERS

BRIDGEMAN/AC

ROYAL RECORDS

The Taylor Prism (below) is inscribed with Sennacherib's feats. Other prisms found at Nineveh detail his advances in engineering and garden-building. British Museum, London

BRITISH MUSEUM/SCALA, FLORENCE

Empire, next to the Euphrates, although in fact the city stood on the banks of the Tigris.

In another passage Diodorus describes the walls of Babylon, detailing its rich depiction of animals, hunted by "Queen Semiramis on horseback in the act of hurling a javelin at a leopard, and nearby her husband Ninus, in the act of thrusting his spear into a lion." No such hunting scene has been found in Babylon. It does, however, correspond closely with neo-Assyrian hunting reliefs engraved on the stone walls of the Northern Palace in Nineveh.

The Hanging Gardens of Nineveh?

Following a recent investigation, Oxford University Assyriologist Stephanie Dalley has argued that the Hanging Gardens were not built by King Nebuchadrezzar II in Babylon at all, but in Nineveh by the Assyrian ruler Sennacherib (r. 704–681 B.C.). Her thesis relies on the annals of his reign, which have been found inscribed on prism-shaped stones. In one the king boasts of the extensive monument-building he undertook: "I raised the height of the surroundings of the palace to be a Wonder for all peoples . . . A high garden imitating the Amanus mountains I laid out next to it with all kinds of aromatic plants."

With its reference to wonder and height, the passage echoes many of the key aspects attributed to the Hanging Gardens. Just as classical writers referred to Babylon's king imitating the landscape of Persia, Sennacherib's annals detail the gardens' imitation of Mount Amanus, a range in the extreme south of modern-day Turkey.

A relief from the time of Sennacherib's grandson, Ashurbanipal (r. 668–627 B.C.), depicts gardens with trees distributed across a slope topped by a pavilion. Water flows from an aqueduct to feed a series of channels filled with fish. The theory that this Ninevan pleasure park could well have been the famed Hanging Gardens is bolstered further by Sennacherib's reputation for engineering innovation. He declared himself to be of "clever understanding." The archives of his reign abound with references to ingenious irrigation systems, and some historians credit him with the invention of the Archimedes water screw. Archaeologists have also found an aqueduct system, built during his reign from two million blocks of stone, that brought water to the city across the Jerwan valley.

The Jerwan structure lies on the route to Alexander the Great's decisive battle with the Persians, at Gaugamela, in 331 B.C. Dalley argues that it is likely Alexander saw the aqueduct as he passed Nineveh. His inquiries into the sophisticated water systems and gardens of that city seeded the story of the Hanging Gardens, which scholarly confusion then misattributed to Babylon. If the theory is true, it would solve a great archaeological mystery, and leave few in doubt that the Hanging Gardens of Nineveh were a wonder indeed.

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Learn more

BOOKS

The Mystery of the Hanging Garden of Babylon: An Elusive World Wonder Traced
Stephanie Dalley, Oxford University Press, 2015

THE HANGING GARDENS OF NINEVEH

THE BRITISH MUSEUM IN LONDON houses this intriguing relief from Nineveh depicting a lush, abundantly irrigated garden. It was produced during the reign of Ashurbanipal (668-627 B.C.), the grandson of Sennacherib, who probably constructed the garden in the course of his major program of monument-building. Scholars consider the relief (colorized here) to be the most complete representation of an Assyrian royal garden; some also argue that it represents the famous Hanging Gardens. ① The king stands in ② the central pavilion and contemplates the splendid garden. On the right, ③ an arched aqueduct carries water to flow to ④ different channels that irrigate the gardens. Trees are arranged across ⑤ slopes, suggesting a succession of terraces, an arrangement that corresponds with descriptions of the Hanging Gardens of Babylon.

SPL/AGE FOTOSTOCK

INTO THE LIGHT
A worker removes volcanic fragments *(lapilli)* from the atrium of the House of Orion in Pompeii's Region V. The decoration being uncovered is characteristic of the so-called First style (200-80 B.C.)

CESARE ABBATE/EPA/EFE

THE GREAT POMPEII PROJECT

THE LATEST DIG INTO POMPEII'S PAST

Stunning frescoes and mosaics, fast-food stands, and a stable with horses are just a few of the recent discoveries made in Pompeii, the bustling Roman city buried and preserved by the eruption of Vesuvius in A.D. 79.

RUBEN MONTOYA

Since its discovery several centuries ago, few archaeological sites have fascinated the world as has the ancient Roman city of Pompeii. After the first major excavations in more than 50 years, Pompeii is revealing a surprising abundance of buried treasures. The new finds are coming from intensive work in a small sector known as Region V that has nevertheless yielded giant insights into the final days of the doomed city.

Along with the complete excavation of two houses—the House of the Garden and the House of Orion—the dig has yielded frescoes, murals, and mosaics of mythological figures in gorgeous colors, skeletons with stories still to be unraveled, coins, amulets, and show horses in the stable of a wealthy landowner.

The new finds are also sparking debate about Pompeii's tragic story. Just before Vesuvius erupted in A.D. 79 and buried the city under a mantle of ash and rock, a local worker scrawled an inscription on a wall. Along with a joke (roughly translated as "he ate too much"), he wrote the date: October 17. The discovery of this inscription may confirm the view that the eruption took place in October, and not August, as some scholars maintain.

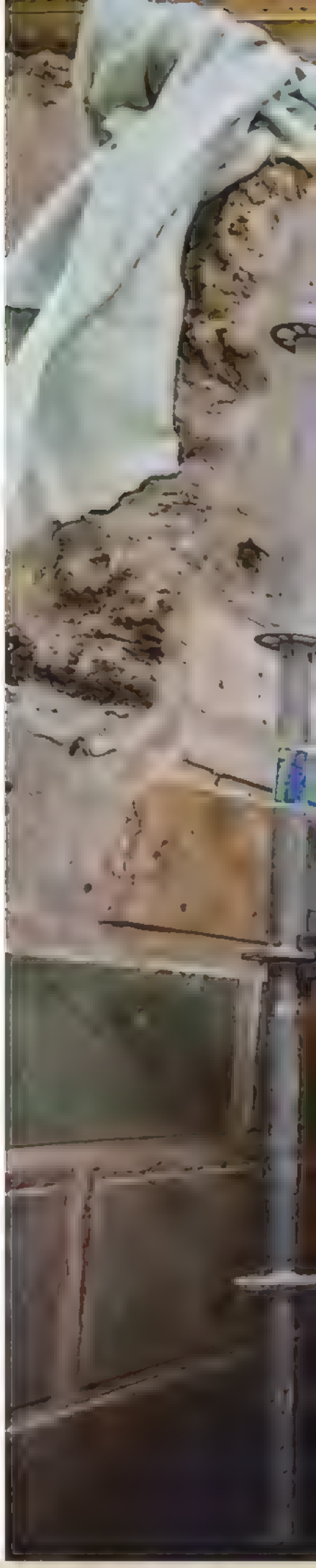
Serendipitous Finds

These remarkable discoveries were not unearthed as part of a dig, but in the course of emergency maintenance of the site. From 2012 until last December, Pompeii was in the archaeological equivalent of an intensive care unit known as the Great Pompeii Project. Funded by the European Union at a cost of $114.8 million, the project was a response to UNESCO's call for urgent action to keep Pompeii off its World Heritage in Danger List.

Since the 1960s, the site had been ravaged by neglect, poor drainage, earthquakes, mass tourism, theft, and vandalism. By 2010, after heavy rains triggered the collapse of the emblematic Schola Armaturarum, used by gladiators to train before fights, Pompeii was falling apart. Just 10 of the city's buildings were open to the public compared with 64 in 1956, and over 70 percent of the site was closed to visitors.

The preservation efforts have been a success so far. Nearly 40 structures are now open to the public, including the Schola Armaturarum, in addition to those that have never been closed, such as the forum and surrounding buildings, theaters, and amphitheater. According to Massimo Osanna, director of the Archeological Park of Pompeii", the Great Pompeii Project "secured the entire archaeological area, restored and reopened entire areas, buildings, and streets denied to the public for too long. Pompeii is now in incomparably better condition than in the past."

The main aim of the Great Pompeii Project was to secure the ancient walls that were in danger of



DIGGING TO SAVE POMPEII

1997
UNESCO names Pompeii a World Heritage site. As it had in 1996, the World Monuments Fund will list Pompeii as endangered in 1998.

2012
Facing a crisis of cave-ins and deterioration, the Great Pompeii Project begins work to shore up the existing site and push ahead with further exploration.

2018
Excavations in the House of Orion reveal extraordinary floor mosaics. Other work in the area uncovers a lovely fresco depicting the myth of Leda and the swan.

2019

In the House of the Garden, a rare trove of jewels and charms is discovered, used for either personal ornamentation or protection against bad luck.

MARBLE HALLS

In the recently identified House of Orion, a restorer cleans stucco panels painted to look like marble, a common "faux finish" in the second century B.C. Prior to the Great Pompeii Project, it was thought that the rooms that constitute the House of Orion were part of the House of Jupiter. This is now believed to be a separate dwelling.

CESARE ABBATE/EPA/EFE

NEIGHBORHOOD GUIDE

In the 19th century archaeologist Giuseppe Fiorelli organized Pompeii into regions and blocks (*insulae*). The first new excavations begun in 2017 focused on Region V to improve water drainage and stabilize the site.

COURTESY OF ARCHAEOLOGICAL PARK OF POMPE

collapse along a two-mile front between the excavated regions and those that have been partially or completely unexcavated—Regions I, III, IV, V, and IX. Earth from earlier excavations from the turn of the 20th century had been dumped into a wedge of land in Region V, which put pressure on excavated areas and caused landslides. The project would remove the debris to decrease the pressure and improve drainage. The latest finds were a by-product of that essential work.

Still Hidden Pompeii

Since its discovery, Pompeii has been one of the longest continually excavated sites in the world. Despite all this work, about a third of Pompeii's 170 acres remain unexplored. Italian archaeologist Giuseppe Fiorelli led explorations for 12 years until 1875 and uncovered about a third of the city. Amedeo Maiuri, ran the site for about 40 years, until 1961, bringing another third to light. Scientifically rigorous, both men recognized that restoration and maintenance were sometimes more important than fresh discovery.

Among the many outstanding discoveries made at Pompeii earlier last century was the unearthing of a mausoleum at Porta Stabia, the city's southern gate. The marble tomb, built shortly before the volcano's eruption, has the longest funerary epigraph ever found—over 13 feet—revealing much about Pompeian life. Other famous finds including the Villa of the Mysteries, located in Pompeii's suburbs, was discovered in 1909 and completely excavated by 1929. It contains what Massimo Osanna called "the best preserved pictorial cycle of antiquity." The House of the Vettii, discovered and restored in 1894, is the first Pompeii domus to be found with all the frescoes and furnishings in situ.

Pompeii's many fine villas reflect the presence of wealthy Romans. Yet Pompeii also had a thriving agricultural and industrial economy. Archaeologists have found over 200 craft workshops, including tanners, textile makers, and bakers. The production of *garum*, a fish sauce, was a staple of the local economy. First-century Pompeii was a metropolitan place of some 15,000 people, with fast-food restaurants and a politically engaged populace.

The Great Pompeii Project has proven that Pompeii still has mysteries left to explore. Archaeologists are to deploy the latest techniques, including ground sensors, drones, CAT scans, and virtual reality, to continue making new finds, and protecting them, to shed light on the daily lives of the people living in Pompeii and bring them to life more vividly than ever.

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THE STREETS OF REGION V

THE EXCAVATION of Region V, wedged between Via del Vesuvio and Via di Nola and covering an area of roughly half an acre, led to the discovery of an upscale housing district with extraordinary frescoes and artifacts. The west side of Region V, from Via del Vesuvio to Alley of the Balconies, can now be seen by the public. Future excavations will focus on Region VIII, a determination made by a pressing need for safety and conservation work.

CITY PLAN: ESTUDI LIMÓS

House of the Dolphins

House of the Garden

House of Leda and the Swan

ALLEY OF THE SILVER WEDDING

ALLEY OF THE BALCONIES

VIA DI NOLA

VIA DEL VESUVIO

House of the Silver Wedding

House of Orion (adjacent to the House of Jupiter)

LIFE AND DEATH

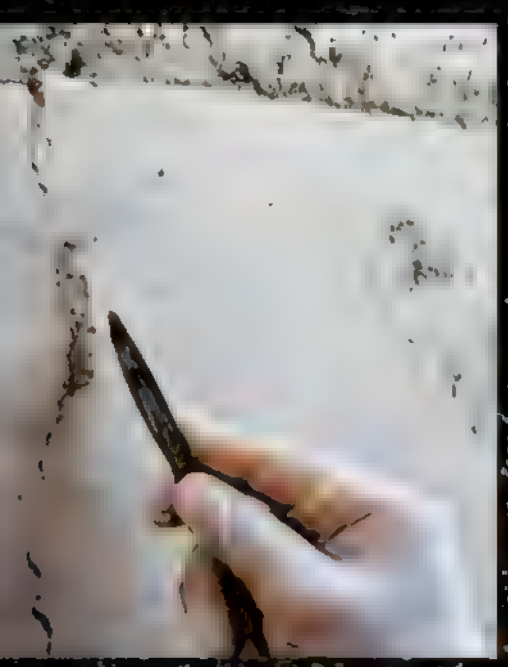
VOLCANO'S VICTIMS AND SURVIVORS

RECENT EXCAVATIONS have unearthed 12 more victims killed by the eruption of Vesuvius. A headless skeleton (below) found in Region V was at first believed to have been decapitated by a massive stone block, but archaeologists later found his skull and determined that death was caused by asphyxiation due to pyroclastic flow—hot gas and rock fragments hurtling through the city at speeds of 50 miles an hour or more. Archaeologists also uncovered signs of survivors. Presumably made by those fleeing, cart wheel tracks were found in 2017 preserved near Porta Stabia, the city's southern gate. An exact count of survivors and fatalities is impossible to gauge even with modern technology. More recent excavations have uncovered more than a thousand skeletons, but early digs did not keep as meticulous records on the number of remains found. Archaeologists estimate a death toll at Pompeii of roughly 2,000 out of a population of 15,000.

THE STONE BLOCK ATOP THIS SKELETON IS BELIEVED TO HAVE FALLEN ON HIM AFTER H S DEATH, CAUSED BY VOLCANIC GAS AND ASH FROM THE ERUPTION.
COURTESY OF ARCHAEOLOGICAL PARK OF POMPEII

THE FALLEN
Workers bear the remains of a young Pompeian boy, which will be undergoing DNA analysis. The child, around age three, was found in 1974 with two adults, presumed to be his parents. The cast has been restored under the Great Pompeii Project

CIRO DE LUCA/REUTERS/GTRES



SUMMER OR FALL?

WRITING ON THE WALL

HISTORIANS have long believed that Vesuvius erupted on August 24, A.D. 79, based on a letter from Pliny the Younger in which he recounts the event as he witnessed it from the other side of the Bay of Naples, but a discovery from Region V challenges that traditional notion. Charcoal writing found on a wall (left) of the House of the Garden includes a date—16 days before the calends of November in the old Roman calendar style—which corresponds to October 17 in the modern calendar. Its presence suggests that the eruption must have happened soon after the graffiti was written because the delicate charcoal would not have lasted long in the open air. The volcanic ash protected and preserved it. The inscription reinforces other evidence that scholars believe point to an October rather than August event: charred autumn fruit, bodies with bulky, warm clothing, wood-burning braziers, wine from the harvest in sealed jars, and a coin that was probably not issued until September A.D. 79. Historians blame confusion over the date on potential errors made in translations and transcriptions in Pliny's famous letter.

HORSE THIEVES

PROTECTING THE PAST

LESS THAN HALF A MILE outside the northern walls of ancient Pompeii, in a suburb called Civita Giuliana, archaeologists found a stable with three horses preserved by the eruption (right). One of them allowed for the first ever plaster cast of a complete horse killed by Vesuvius (below). Separate from the Great Pompeii Project, this 2018 excavation was prompted by a police investigation. Grave robbers had built tunnels into the site to steal artifacts to sell on the black market. The illegal excavations damaged two of the horses and other artifacts, along with ancient walls and plasterwork, but one horse remained untouched. Archaeologists secured and excavated the site, which revealed a richly frescoed villa with an attached stable and cultivated lands. Analysis of the horses revealed them to be in good health and of large size. Based on their physical condition and the remains of a bronze-plated military saddle, they were probably purebreds, a sign of high social status. These horses were likely bred for local events, such as races, circuses, and parades.

A PLASTER CAST REVEALS THE FINAL MOMENTS OF A HORSE (ABOVE), WHOM ARCHAEOLOGISTS BELIEVE WAS TETHERED AND UNABLE TO ESCAPE THE ERUPTION.

COURTESY OF ARCHAEOLOGICAL PARK OF POMPEII

CESARE ABBATE/AP IMAGES/GTRES

SWAN SONG

Photographed soon after discovery, this fresco and the swan was still under layers of volcanic pumice stone. Since the image was taken, the pumice has been cleaned away, and the masterpiece can now be viewed by the public.

CESARE ABBATE/AP IMAGES/GTRES

LEDA AND THE SWAN

CONSPICUOUS CONSUMPTION

IN A SMALL BEDROOM in a house excavated in Region V's Via del Vesuvio, archaeologists came upon a rendering of Leda and the swan (left), one of the most spectacular finds of the Great Pompeii Project. The well-preserved fresco depicts the Greek myth of Leda being seduced by Zeus in the form of a swan; one of their children, the beautiful Helen, would launch a thousand ships to start the Trojan War. Unlike other Roman depictions of this story, Leda looks directly at the viewer, turning observers into voyeurs. Other myth-inspired frescoes, along with figures of maenads and satyrs, adorn the walls of this lavish home, creating a kind of Dionysian celebration. "These are iconographies that this specific social and political class liked," said Massimo Osanna, the site's director. The use of so much of this iconography, however, suggests to Osanna that this person was newly rich, perhaps a freed slave, who was trying hard to appear culturally sophisticated.

PRIAPUS WEIGHS HIS NOTABLY LARGE PHALLUS. A COMMON FRESCO MOTIF, IT WAS NOT REGARDED AS SEXUAL, BUT AS A REPRESENTATION OF FERTILITY AND WEALTH.

COURTESY OF ARCHAEOLOGICAL PARK OF POMPEII

ALLEY OF THE BALCONIES

LIFE ON THE STREETS

EXCAVATIONS IN 2018 to stabilize walls in northern Pompeii's Region V unearthed the Alley of the Balconies. This unique region of Pompeii revealed a mixing of social classes. The alley is a narrow street lined with grand houses, some of which feature a rare find—four large second-floor balconies (below), well preserved because they collapsed on a bed of *lapilli*, or soft pumice, from the volcano's eruption. One terrace still had amphorae, terra-cotta jars for wine and oil, laying on their sides, probably left outside to dry. Also, at the corner of Alley of the Balconies and Alley of the Silver Wedding (named for the spectacular villa found there in 1893), archaeologists found a neighborhood snack bar, or *thermopolium* (lower far right), which were popular places for the working classes to grab a bite. Although only partially excavated, it has added further detail to the picture of everyday life in Pompeii. These discoveries, along with some well-preserved frescoes in homes that lined the street, have been added to a new tour that connects Via di Nola with the House of the Silver Wedding.

THE ALLEY OF THE BALCONIES. A GROUPING OF TILES (CENTER) INDICATES A BALCONY ROOF.
CIRO FUSCO/ANSA/AP IMAGES/GTRES

A CUPID FOUND IN A HOME ENTERED THROUGH THE ALLEY OF THE BALCONIES
CIRO FUSCO/ANSA/AP IMAGES/GTRES

NEREID RIDING A HIPPOCAMP FOUND IN THE ALLEY OF THE BALCONIES

FAST FOOD
A fresco of a server decorated a *thermopolium*, a hot-food outlet, in the Alley of the Balconies. Some 80 *thermopolia* have been found in Pompeii. They typically catered to the lower classes with menus likely to include baked cheese, lentils, and salted fish, accompanied by *garum*, a fermented fish sauce.

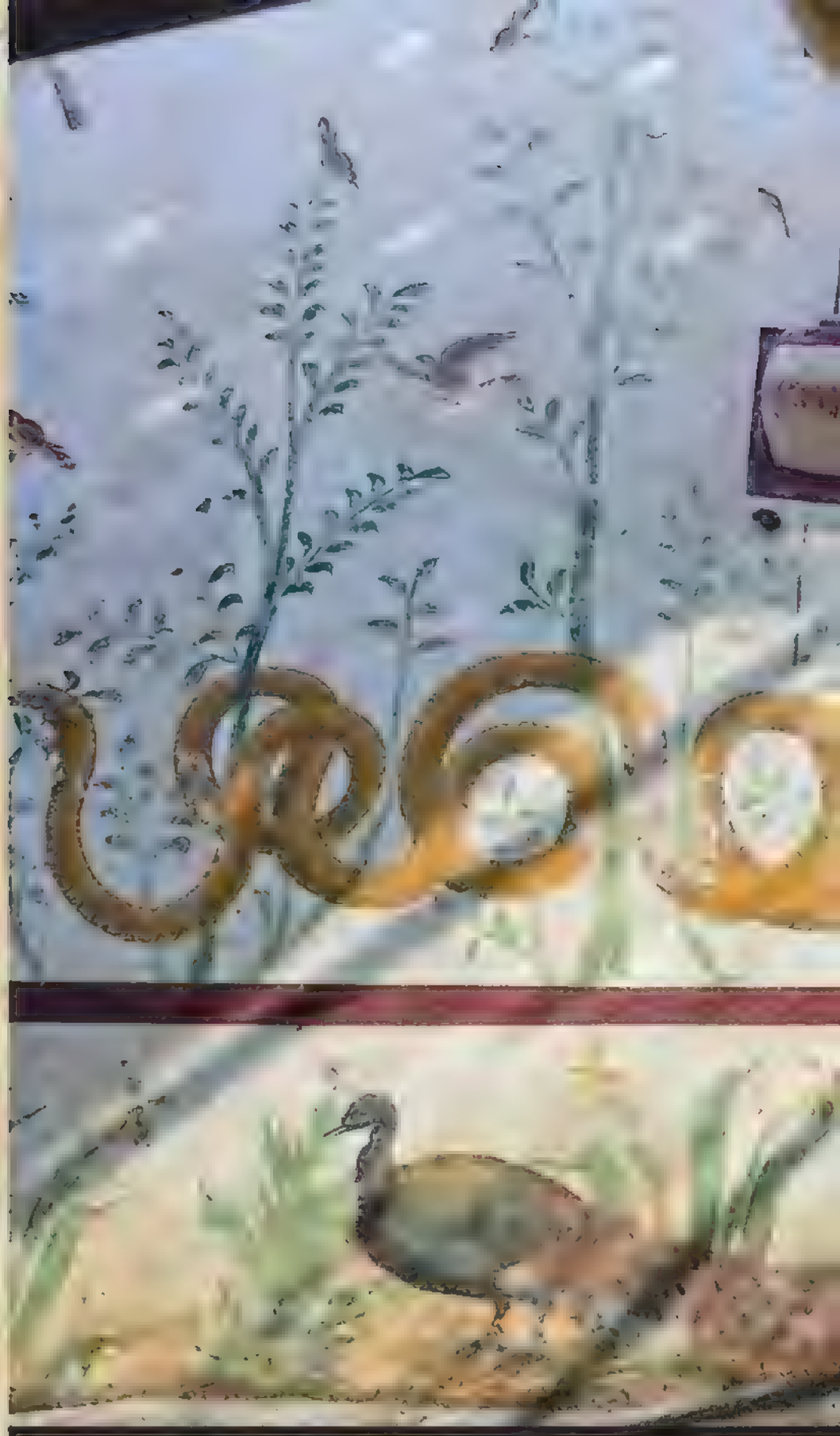
COURTESY OF ARCHAEOLOGICAL PARK OF POMPEII

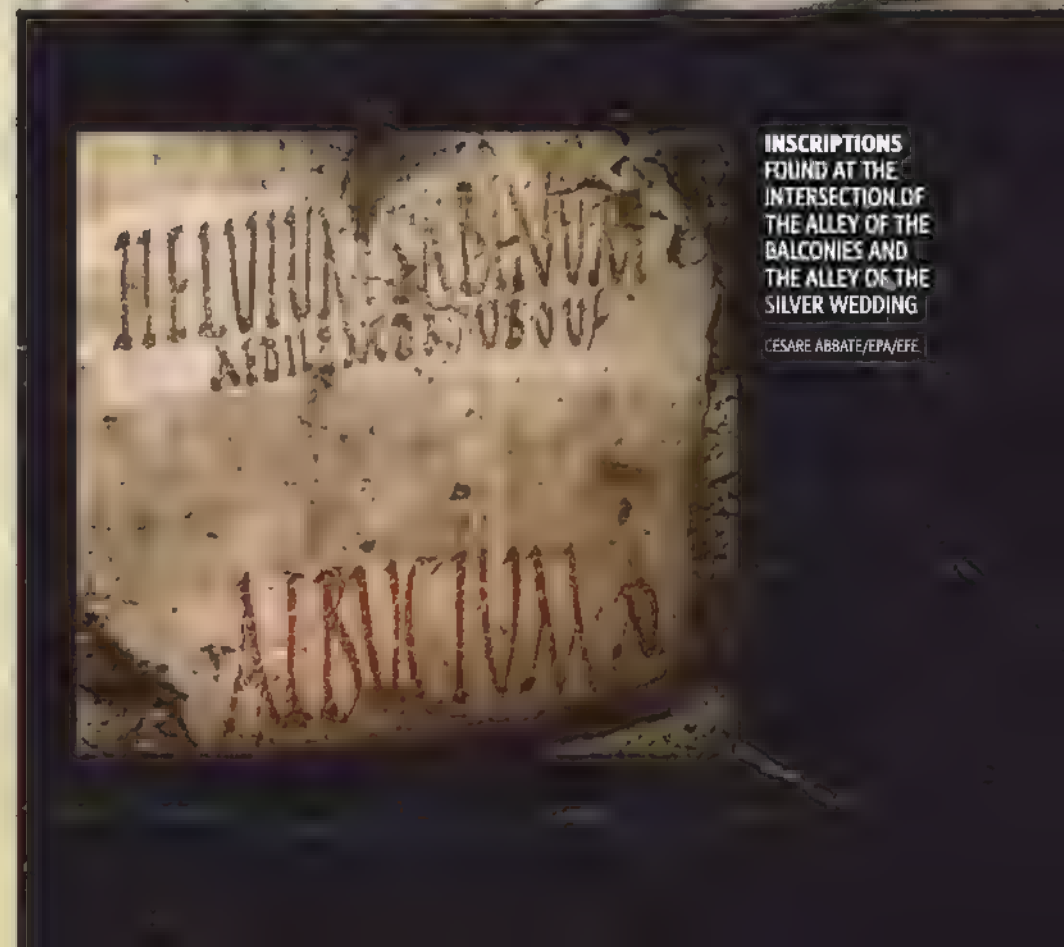
THE LARARIUM

DOMESTIC TEMPLES FOR DOMESTIC GODS

ONE OF THE MOST distinctive features of a Pompeian house is the *lararium*, a shrine to the household gods. Called Lares, these deities protected the family, and statues of them were often placed in a special niche for worship. In 2018 archaeologists unearthed a semi-enclosed courtyard (right) in Region V, with one of the finest examples of a lararium ever discovered in Pompeii. The niche for the shrine is flanked by painted twin images of Lares. Painted on the wall beneath the niche are two large serpents, symbolizing prosperity and good luck, and a pedestal topped with food and offerings. On the floor rests a small stone altar that still bears traces of burnt offerings to ensure the goodwill of the Lares. The space is decorated to resemble a magnificent garden. Birds flit among the trees, while a peacock seems to stroll along the ground, blending in with painted plants and real ones that once grew in a flower bed along the wall. A dynamic hunting scene was painted on a vibrant red wall (detail below). A massive black boar is being pursued by other animals, who are close to bearing down on it.

HUNTING SCENE PAINTED ON ONE OF THE WALLS OF THE LARARIUM
COURTESY OF ARCHAEOLOGICAL PARK OF POMPEII





INSCRIPTIONS FOUND AT THE INTERSECTION OF THE ALLEY OF THE BALCONIES AND THE ALLEY OF THE SILVER WEDDING

CESARE ABBATE/EPA/EFE

CONSERVATOR MASSIMO OSANNA EXAMINES A FRESCO IN A COURTYARD SHRINE, OR *LARARIUM*, IN POMPEII.

CIRO FUSCO/EFE

CAMPAIGN POSTERS

POMPEII POLITICS

THE ALLEYS AND WALLS of Pompeii were alive with inscriptions, most commonly political campaign "posters" and personal greetings. Technically, these posters are *depinti* (painted onto plaster), intended for a broad audience, while graffiti (scratched into plaster) were handwritten by anyone, usually names and greetings to friends. Nearly 4,000 campaign posters have been documented in Pompeii, according to Rebecca Benefiel, professor of classics at Washington and Lee University. Benefiel heads the Ancient Graffiti Project, which is building an online catalog of Pompeii's wall inscriptions. "Candidates running for office knew how to get their name out," she says. Recent excavations in Region V uncovered more posters from municipal elections in the spring prior to the deadly eruption of A.D. 79. The inscription (left) reads, "Vote for Helvius Sabinus as aedile [magistrate], a good man, worthy of office." Below it is a partially excavated inscription in support of Lucius Albucius, a rival candidate. Generally, personalized recommendations for candidates emphasized the person as "a good man" or "man of integrity." But one stands out as a particularly interesting insight into the presuasion tactics used in Pompeii: "I ask that you vote for Gaius Julius Polybius for aedile. He brings good bread." Since Polybius has been identified elsewhere and is not a baker, Benefiel thinks he probably paid for free bread distribution to win over voters.

HOUSE OF ORION

MIXING THE OLD AND NEW

FIRST EXCAVATED in the 18th century, a domus on the Via di Nola, the House of Jupiter, was named for a small painting of the Roman god found in the home's lararium. The most recent Pompeii excavations have returned to this domus to obtain a fuller picture of its architecture, decor, and history. In 2018 archaeologists uncovered a stunning and highly unusual mosaic of an enigmatic mythological episode (right). The central figure was later identified as Orion. Following more studies, the researchers came to the conclusion that it formed part of a separate house, lying adjacent to the House of Jupiter, now called the House of Orion. The mosaic and other finds in this home have provided new insight into the upper echelon of Pompeian society. The owner of this house was not only wealthy but cultured. The atrium, for example, features old-fashioned First style, while the bedrooms are decorated in the contemporary Third or Fourth style. Archaeologists contend that the owner's choices intended to show off his appreciation for both the classic and the new.

THE HOUSE OF ORION, PHOTOGRAPHED HERE IN MARCH 2019, WAS FULLY EXCAVATED AS PART OF THE GREAT POMPEII PROJECT.

CIRO DE LUCA/REUTERS/GTRES

MYSTERIOUS METAMORPHOSIS

This magnificent mosaic's central figure is identified as the hunter Orion, for whom the house has been named. In the best known version of his tale, the goddess Artemis accidentally kills Orion. In her grief, she places her friend among the stars. This mosaic shows a variation of the story in which the goddess Gaea (in the form of the snake) sends a scorpion to kill Orion for threatening to hunt all of Earth's creatures. The scorpion's sting transforms Orion into a winged being, while a deity guides him upward and another prepares his crown. Pompeii archaeologist Francesco Muscolino considers that the mosaic's variation on the myth could be inspired by a lost poem.

CIRO DE LUCA/REUTERS/GTRES

HOUSE OF THE GARDEN

BANGLES, BAUBLES, AND BEADS

IN THE HOUSE OF THE GARDEN, situated in Region V, the remains of a group of people, including women and children, were found huddled together in a room. One of them might have been the owner of a wondrous wooden box filled with charms, ornaments, and figurines (right). The collection was found among the charred remains of the box and its bronze hinges. Some of the pieces were most likely worn as decorative jewelry, while other objects might have had a more "magical" purpose. Trinkets like intricate carved figurines of skulls and animals (center), bronze bells (upper right), glass beads bearing likenesses of the gods (upper left), and amethyst scarab amulets (lower left) could have been used to draw good fortune, promote fertility, or provide protection. Among the lucky charms were also two mirrors, necklace fragments, and glazed ceramics.

A GRACEFUL TREE STANDS AMONG A GATHERING OF PEOPLE IN A FRESCO RECENTLY UNCOVERED INSIDE THE HOUSE OF THE GARDEN.

COURTESY OF ARCHAEOLOGICAL PARK OF POMPEII

CESARE ABBATE/EFE

PICKETING THE PRESIDENT

Holding banners of purple, gold, and white, suffragists stood in front of the White House to attack President Woodrow Wilson's refusal to back the Susan B. Anthony amendment.

ALBUM/GRANGER, NYC

THE SILENT

UNYIELDING WARRIORS IN THE BRUTAL

TINA CASSIDY

SENTINELS

FIGHT FOR THE 19TH AMENDMENT

PARADE FOR PROGRESS
The official program for the Woman Suffrage Procession (above) sounded the call for a new beginning in the fight for women's rights in the United States.
WORLD HISTORY ARCHIVE/ACI

SIGNS FOR CHANGE
MASSIVE CROWDS GATHERED ALONG PENNSYLVANIA AVENUE ON MARCH 3, 1913, TO WATCH MORE THAN 5,000 SUFFRAGISTS, 20 PARADE FLOATS, NINE BANDS, AND FOUR MOUNTED BRIGADES.
ACI

American women had been fighting for the vote for nearly 70 years when Woodrow Wilson won the presidential election in November 1916. It would be Wilson's second term, and suffragists were disappointed. Wilson first took office in 1913, and one day prior to his Inauguration, they had staged a huge woman suffrage parade of more than 5,000 people marching up Pennsylvania Avenue in Washington, D.C.

Almost four years had passed, and U.S. women still did not have the vote. Wilson's reelection felt like a major setback, but the suffragists, led by Alice Paul and Lucy Burns, decided to turn their grief into action. They met on January 9, 1917, at the new headquarters of the Congressional Union for Woman Suffrage, Cameron House, located just steps from the White House. There they would hear a plan, by Harriot Stanton Blatch, daughter of Elizabeth Cady Stanton.

Blatch told them: "We have got to bring to the President, day by day, week in, week out, the idea that great numbers of women want to be free, will be free, and want to know what he is going to do about it. We need to have a silent vigil in front of the White House until his inauguration in March."

They listened as Blatch offered a new form of protest. In America pickets had become a common union tactic, and Blatch had used pickets in her Votes for Women campaign with the New York Legislature in 1912, so when she delivered her final plea to the women of Cameron House, they stirred. "Will you not," she asked, "be a 'silent sentinel' of liberty and self-government?"

The First Vigils

On January 10, 1917, a dozen or so suffragists bundled themselves into wool coats, hats, and gloves and draped purple, white, and gold sashes across their chests. As they braced for the bitter January chill, they were fortified with Paul's advice: Don't be provoked into a physical or verbal confrontation, don't make eye contact with angry bystanders, stay quiet, and keep your backs to the gate for safety and to make sure the public can read the signs.

The group marched to the White House in single file while Paul stayed behind to manage the protest from headquarters. They arrived outside 1600 Pennsylvania Avenue and took their positions, standing silently and holding their signs, which begged for answers to tired questions: "MR. PRESIDENT, WHAT WILL YOU DO FOR WOMEN'S SUFFRAGE?" and "HOW LONG MUST WOMEN WAIT FOR LIBERTY?"

The sentinels had been in position for only 40 minutes when Woodrow Wilson's car returned to the White House. Smiling broadly but ignoring them, he zipped through the gates. Nonetheless,

THE FIRST WOMEN'S MARCH

TAKING IT TO THE STREETS

One day prior to the start of Woodrow Wilson's first term as president, thousands of people gathered in Washington, D.C., to march for women's right to vote. Continuing a fight begun more than 60 years before, this demonstration would be the first national event to unite efforts from all over the country. Alice Paul and the National American Woman Suffrage Association brought together delegations from across the country, including such notable participants as journalist Ida B. Wells-Barnett, activist Helen Keller, and journalist Nellie Bly. In its opening moments, the march proceeded smoothly, but unruly crowds (made up mostly of men in town for the Inauguration) turned ugly: spitting upon the women, blocking and shoving them down. About 100 people were injured while the police did little to quell the violence. The march is credited with giving a kick start to the suffrage movement and its fight for equal rights.

the president must have been shocked; never before in the history of America had anything like this happened in front of the White House.

Officials were unsure how to handle the situation. Major Raymond W. Pullman, the superintendent of police, knew the suffragists did not need a permit if they were not advertising anything and that, as of now, there was no violation of the law. The sentinels stood there, peacefully, until early afternoon and would stay until dark. Back at headquarters, Paul informed the press that the pickets would continue this silent protest from 10 a.m. to 6 p.m. daily, except for Sundays until the president's Inauguration. But, she said, the protest was designed to continue until the Susan B. Anthony amendment passed.

The news of this ongoing protest had an immediate effect, overwhelmingly negative, even among suffragists. Carrie Chapman Catt told the *Washington Times*, "I think the Congressional Union is beginning at the wrong end when it seeks to embarrass the President." The National Association Opposed to Woman Suffrage called the picketing "a menace to the life of the president—a silent invitation to the assassin," and said "it is impossible to follow the mental processes of the women who devised the picket idea. As an argument it ranks with the small boy's thrusting out his tongue. As a demonstration of fitness for the vote it is idiotic."

Even close allies were upset by the brazenness of it all. Paul's own mother, familiar with her daughter's single-minded focus and stubbornness, wanted her to call it off. One organizer told Paul to "use your own splendid talents for something besides circus tricks!" Even as a slew of women quit the Congressional Union, Paul refused to adapt or apologize; she was unremitting, responding to her critics with copies of *The Suffragist*, so they could "learn what we are attempting to do."

Well beyond that first day, the Silent Sentinels persevered. If it was raining, sleeting, or snowing, the protesters adhered to a rotation of two-hour shifts. Their commitment amplified their notoriety while softening the opposition. Even the most hardened anti-suffrage forces felt sorry for these

CLARION CALL

Made by New York suffragists around 1915, a button (below) trumpets the suffrage cause. The 10 stars on the flag represent the number of states that had granted women the right to vote.

A.BJM/GRANGER, NYC

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ATTENTION SEEKER

ALICE PAUL'S P.R. STRATEGY

Born on January 11, 1885, in Mount Laurel, New Jersey, Alice Paul (left, photographed around 1915) was one of the masterminds in the plan to secure voting for American women. Educated at Swarthmore, the New York School of Philanthropy (now Columbia University School of Social Work), and the University of Pennsylvania, she used her education and experience to guide the movement to the national stage (she would later earn three law degrees from American University). She was living in England in 1907 at the time when English women were fighting for their right to vote. Paul joined the movement and learned tactics from militant suffragists Emmeline and Christabel Pankhurst. She saw how pickets, arrests, imprisonment, and hunger strikes could be used to generate publicity. When Paul returned to the United States in 1910, she brought these lessons with her to deploy in the fight to secure American women's right to vote. After the ratification of the 19th Amendment in 1920, Paul continued to fight for equality. In 1923 she proposed what she called the "Lucretia Mott Amendment," better known today as the equal rights amendment.

BADGE OF HONOR

Alice Paul and other Silent Sentinels received a pin (below) to honor their efforts. On the reverse is engraved, "For service in the cause of the freedom of women Presented by the National Woman's Party."

NMAH, SMITHSONIAN INSTITUTION

shivering, dripping women. One congressman told a picket that there was "something religious" about the Silent Sentinels. "To me," he said, "it has already become a part of the modern religion of this country." For the Inauguration, the rainy weather in early March matched Wilson's mood as he left the White House for his swearing-in at the Capitol. Nearly a thousand suffragists with raincoats and boots assembled into formation behind a banner bearing these words: "MR. PRESIDENT, HOW LONG MUST WOMEN WAIT FOR LIBERTY?" Behind it, an American flag waved to show that those protesting during the president's Inauguration were patriots, too.

The rest of the line, making its way to surround 1600 Pennsylvania Avenue on Wilson's first official day of his second term—was organized alphabetically with each state represented. As they made their way toward the White House, 5,000 people, most of them Inaugural visitors and many lured by posters advertising the protest, cheered them. The protesters circled the White House four times, each lap representing a year that they had pressed for a federal amendment.

Declarations of War

The suffragists' rapport with the police and the public had grown in the nearly three months of picketing. Having made it through the harshest season, their colorful presence was as welcome as the matching spring landscape. This cordial relationship would change in April 1917 after the United States entered World War I. Many assumed the protesters would do their patriotic duty and hang up their sashes in deference to the war, spending their volunteer time working for the war effort.

The idea of women being pressed into service, even if it was as a volunteer and carrying other burdens of war, did generate sympathy for suffrage. Within weeks, Michigan, Rhode Island, and Nebraska granted equal voting rights to women. This war, one that Wilson had framed around the intangible ideals of democracy, encouraged Americans to be accountable to these principles as well. If young men were willing to die for liberty on the other side of the ocean, the least Americans could do was grant all of their citizens suffrage.

MENACING MOB

Male observers often harassed the Silent Sentinels during their protests. American suffragist Mabel Vernon ignores their insults as she carries her banner.

TOPICAL PRESS AGENCY/GETTY IMAGES

KAISER WILSON
HAVE YOU FORGOTTEN YOUR SYMPATHY WITH THE POOR GERMANS BECAUSE THEY WERE NOT SELF-GOVERNED?
20,000,000 AMERICAN WOMEN ARE NOT SELF-GOVERNED.
TAKE THE BEAM OUT OF YOUR OWN EYE.

SIGNS OF PROTEST

Viewed by some as unpatriotic, the Silent Sentinels' signs pointed out the contradiction between President Wilson's position on World War I and U.S. woman suffrage (above).

. BRARY OF CONGRESS

Things took a turn after a Russian delegation's visit to the White House in June 1917. Lucy Burns and other suffragettes assembled in front of the White House shortly before the meeting with the Russians. They unfurled a 10-foot, hand-stenciled cloth sign, stretched between two wooden posts, addressed to the Russian envoys, telling them that "America is not a democracy. Twenty million American Women are denied the right to vote." To attack the president so directly in front of diplomatic guests was an unprecedented outrage. The situation quickly grew tense.

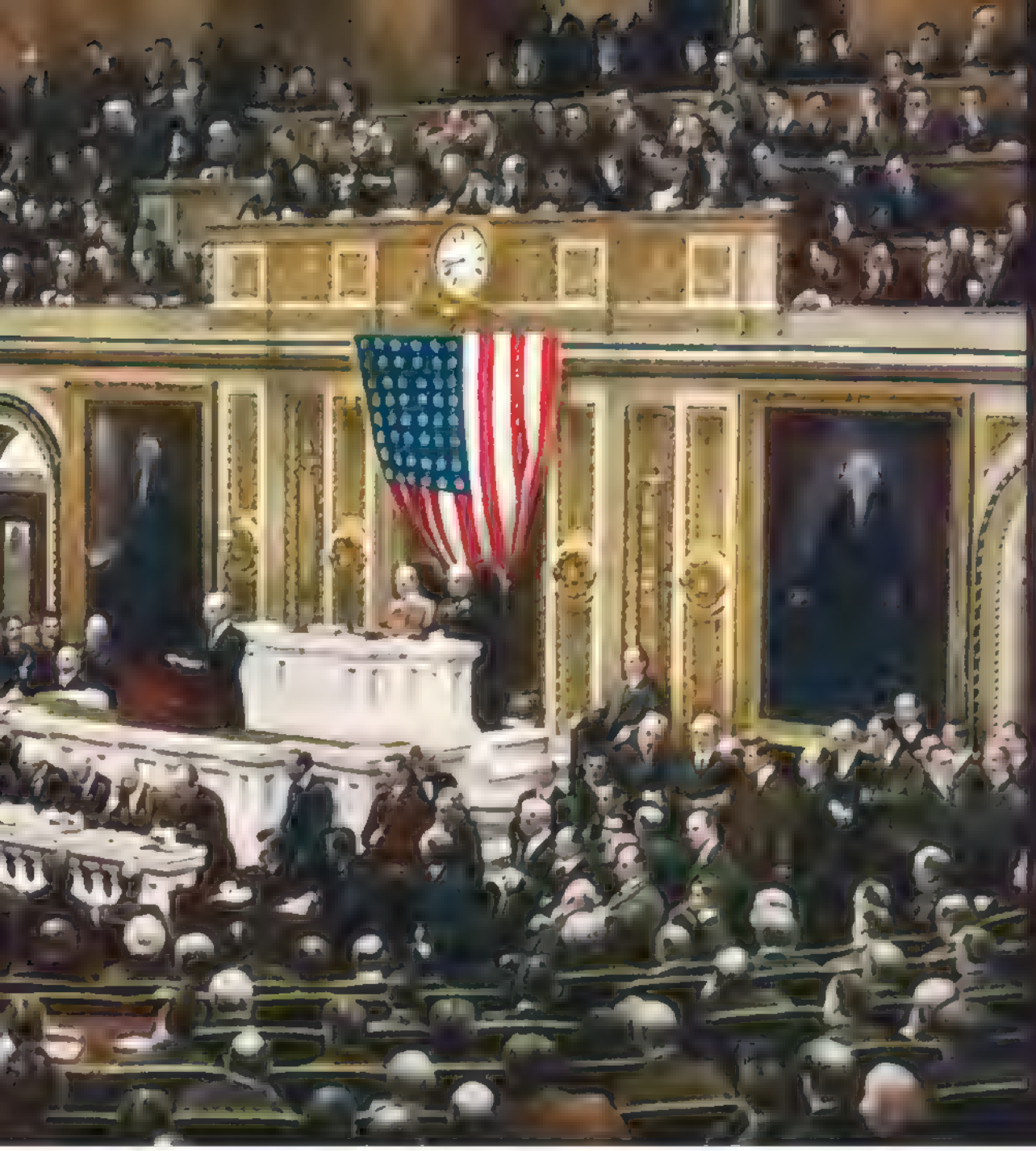
"Take down that banner or I'm through with woman suffrage for life," one man screamed at Burns. "You are a friend to the enemy, and a disgrace to your country," one woman sneered at the protesters. Men in the crowd ignored police directions to disperse, and destroyed the sign, pushed Burns, and left the women stunned but standing. From across the street, suffragists watched in horror as the men closed around their colleagues. All they could see was the top of the poles and people in straw hats surging this way and then that way. They held their breath as the guards approached to break up the scene. Despite the scuffle, there would be no arrests that day.

Americans were outraged that the women were not hauled off to jail. They told the press and wrote letters to Wilson declaiming what they thought was a double standard: If the pickets had been men, they would have been cuffed for provoking a riot. D.C. police superintendent Pullman conferred with the president and his administration. Going forward, Pullman agreed to find some excuse, however flimsy, to arrest the suffragists "if the thing was attempted again."

The threat of arrests did not scare Paul. She told the press that she planned to repeat the Russian protest the next day. "We have ordered another banner with the same wording and we intend to show it in the same place," she said. Sure enough, within 24 hours, the Silent Sentinels were back at their posts.

Behind Bars

Planning her next steps, Alice Paul publicly committed to continue despite outbreaks of violence. On June 21, 1917, Lucy Burns and Katharine Morey



WILSON DECLARES WAR

BATTLE OF WORDS

World War I had been raging in Europe since July 1914. By 1917, the Allies (Russia, France, the United Kingdom, Italy, and Japan) and the Central Powers (Austria-Hungary and Germany) had been mired in a prolonged war of attrition. President Wilson had struggled to keep the United States out of the war, but Germany's naval aggression toward American vessels made that impossible. On April 2, 1917, Woodrow Wilson asked Congress for a declaration of war because "the world must be made safe for democracy." Suffragists were listening. They adopted Wilson's words from his war message to Congress for use in their fight, framing the fight to protect European democracy as the equivalent of fighting for Americans' rights at home. Suffragist Lucy Burns would even compare Wilson to Germany's bumbling Kaiser Wilhelm II, who had been framed as trampling the rights of the German people.

carried a banner to the White House gate, but a group of boys grabbed their sign and tore it apart. The police did nothing. More sentinels emerged with banners, and the conflict escalated. Police called for backup and did their best to prevent a riot from breaking out.

Inside the White House, the administration wanted to end the protests without giving the women more publicity. They tried to negotiate with Paul, but she was unmoved. The protests would continue. Superintendent Pullman knew he had no choice: He told Paul, "If anybody goes out again on the picket line, it will be our duty to arrest them."

On June 22 outside the White House, three suffragists held up a sign containing Wilson's own words from his war message to Congress on April 2: "WE SHALL FIGHT FOR THE THINGS WHICH WE HAVE ALWAYS CARRIED NEAREST OUR HEARTS—FOR DEMOCRACY, FOR THE RIGHT OF THOSE WHO SUBMIT TO AUTHORITY TO HAVE A VOICE IN THEIR GOVERNMENT."

The officers arrested the women, who were charged with blocking traffic and unlawful assemblage. Rather than send the women to prison and risk turning them into martyrs, Pullman released them on personal recognizance. Despite the arrests, Paul announced that they would never stop picketing and more arrests followed.

Following a series of protests in early July, Judge Alexander Mullowney decided to switch tactics: "I hate to do it, but under the law there is nothing else for me to do. I can fine you $25 but that's nothing. I know it's not going to make you quit marching in front of the White House." He offered fines or a three-day sentence in jail. The sentinels chose jail, and the protests continued.

Sixteen more women were later arrested for protesting and booked for "unlawful assembly." The defendants included Alison Hopkins, whose husband, John, had helped finance Wilson's campaign. On Monday, Judge Mullowney issued a new ruling: "Sixty days in the [Occoquan] Workhouse in default of a $25 fine," the judge said. Again, the women chose jail.

The sentinels' sentence would be served in a Virginia workhouse an hour away from

FIGHT FOR DEMOCRACY

On April 2, 1917, President Woodrow Wilson addressed Congress to ask for a declaration of war against Germany (above). Congress passed the resolution four days later, and the United States officially entered World War I.

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NEVERTHELESS SHE PERSISTED

LUCY BURNS, A FIERCE FIGHTER

Lucy Burns (left) was born in Brooklyn, New York, in 1879. The bold red-headed activist studied at Vassar College, Yale University, the University of Berlin in Germany, and Oxford University in England, where she became involved in the woman suffrage movement. She first met fellow American Alice Paul in a London police station after they both had been arrested protesting outside Parliament. The two women would return to the United States to lead the movement for woman suffrage there. Burns's unapologetic presence at protests and combative signs as a Silent Sentinel led to multiple arrests and jail time. Burns would end up spending more time in jail than any other U.S. suffragist. After ratification of the 19th Amendment in 1920, Burns decided to take a step back from public life and the fight for equal rights. She explained: "I don't want to do anything more. I think we have done all this for women, and we have sacrificed everything we possessed for them, and now let them fight for it now. I am not going to fight anymore."

COMPETING FOR COVERAGE

The suffrage movement generated headlines (below) that competed for attention with the latest news from the battlefields of World War I.

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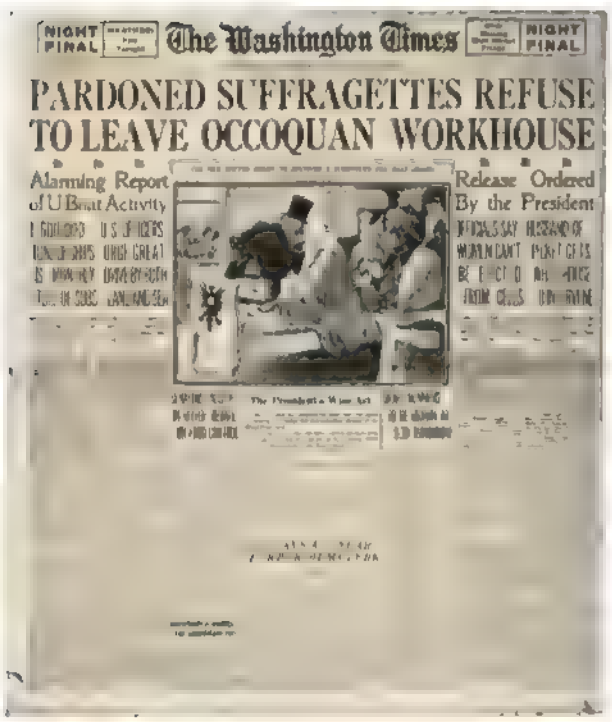
NIGHT FINAL The Washington Times NIGHT FINAL

PARDONED SUFFRAGETTES REFUSE TO LEAVE OCCOQUAN WORKHOUSE

Alarming Report of U Boat Activity

Release Ordered By the President

Washington, D.C. Harsh living conditions, inedible food, and limited contact with the outside world awaited them there. After John Hopkins visited his wife Alice at the workhouse, he grew angry and confronted the president.

Hopkins had worked with Woodrow Wilson for years, joined in the common cause of progressive politics. The two were now at loggerheads. "In view of the seriousness of the present situation," Hopkins said, "the only solution lay in the immediate passage of the Susan B. Anthony Amendment." He told the president there were enough votes in both chambers for it to pass. Wilson, turning defensive, said he would take his own poll to find out if that was true.

Hopkins was not the only one objecting to the suffragists' prison term. Telegrams poured into the White House as well as the National Woman's Party (the successor to the Congressional Union) headquarters from those upset by the harsh punishment these women had received. Wilson struggled over what to do and decided a pardon was the best course of action. When the sentinels at Occoquan learned of the pardon, they refused to accept it. They had committed no crime, so there was no reason for a pardon.

Their attorney, Dudley Field Malone (who had resigned from Wilson's administration for its failure to support woman suffrage), explained that while they could not be forced to accept the pardon, the attorney general would kick them out of the workhouse anyway and the public would interpret the outcome as if they had taken the president's offer. That's exactly what happened.

After the women's release, the press was eager for a statement. John Hopkins put his conversation with the president on the public record, saying Wilson predicted Congress would pass the Susan B. Anthony amendment in the current session if they had the chance to vote on it. Paul told reporters that the picketing would continue as "picketing has accomplished just exactly what we wanted it to accomplish, and picketing is going to end in forcing the issue."

POLICE INTERVENTION

Beginning in 1968, police confronting protesters in Memphis, Tennessee, would sometimes deploy tear gas, which was banned in warfare by international treaty. Police also used batons and other weapons.

CRUEL AND UNUSUAL

Arrested in 1917 for her participation in the Silent Sentinels protests, Kate Heffelfinger was too weak to walk on her own after being released from the brutal conditions of Occoquan Workhouse.

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OCCOQUAN WORKHOUSE
HOUSED MANY OF THE SILENT SENTINELS ARRESTED IN 1917
EARLY 20TH CENTURY PHOTOGRAPH
GRANGER

Days and Nights of Terror

The Silent Sentinels continued protesting into August, creating more and more inflammatory signs. As the protests continued, the women were struck, knocked down, and dragged by rioters. Similar scenes played out day after day with more pickets, more attacks, and finally, more arrests. On August 17, six women were sentenced to month-long confinements at the workhouse.

Events throughout September led to a new intensity in the campaign. By the end of September, two dozen suffragists were confined to Occoquan Workhouse. Alice Paul was frank with potential protesters: Be prepared to go to prison for up to six months. On October 20, 1917, Paul herself was arrested with several others in front of the White House and later sentenced to seven months in the district jail. As Paul was led out of the courtroom, she told reporters: "I am being imprisoned . . . because I pointed out to President Wilson the fact that he was obstructing the cause of democracy and justice at home, while Americans fight for it abroad." She said she expected to be treated as a political prisoner.

In early November Paul began a hunger strike. Three days in, prison physicians examined Paul and tried to change her mind, but she remained steadfast. The doctors decided to force-feed her. Paul was taken to the psychiatric ward and strapped down. A tube was stuck up her nose and milk and raw eggs were funneled down her throat. The ghastly ritual occurred three times that day.

Although news reports said Paul took the nourishment without protest, she smuggled out her own account. On November 10, 41 women protested her treatment outside the White House; 31 were arrested, including Lucy Burns, who had been released from prison only a few days before. The pickets were sentenced to varying terms at Occoquan Workhouse; Burns received the harshest penalty: six months.

Malone, with so many legal issues swirling, made Paul his top priority. He was granted a court order to see her. When he arrived, he barked at the staff to take her out of the psychiatric ward. Paul, faint and feeble, was carried on a stretcher to the hospital section. There, the forced feedings continued for the next two weeks.

OCCOQUAN WORKHOUSE

HUNGER STRIKES

Occoquan Workhouse (later Lorton Reformatory and Lorton Correctional Complex) was built in Virginia as a jail for Washington, D.C., in 1910. Mostly poor and lower class women were housed there when the Silent Sentinels joined them in 1917. When the suffragists employed hunger strikes to protest their imprisonment, the workhouse staff tried tempting them with fried chicken and fresh eggs and coffee for breakfast—a switch from the usual spoiled food served there. No one succumbed. "I think this riotous feast which has just passed our doors is the last effort of the institution to dislodge all of us who can be dislodged. They think there is nothing in our souls above fried chicken," said a note Lucy Burns slipped around. After the jail closed in 2001, a portion of it was transformed into the Workhouse Arts Center and the Lucy Burns Museum, the latter dedicated to the 91-year history of the prison and the Silent Sentinels imprisoned there.

The pickets most recently arrested, including Burns, arrived at Occoquan on November 15. The suffragists demanded to be treated as political prisoners but were seized and tossed into a cell. One, 55-year-old Dora Lewis, hit her head on the wall and crumpled to the floor, motionless. Lewis regained consciousness. Burns, described as "worth her weight in wild cats," fought two guards the whole way to the cell.

When Burns began calling the roll to see if everyone was okay, the guards ordered silence and threatened to put them in straitjackets. Burns continued to speak, so they handcuffed her wrists above her head to the cell door and threatened to put a gag buckle over her mouth. Cellmate Alice Cosu had a heart attack and vomited throughout the night. Another woman from their group was locked up with the male prisoners, who were told that they could do whatever they wanted with her. The next day, 16 of these women went on a hunger strike. The superintendent, targeting the ringleaders, ordered the force-feeding of Burns and Lewis first.

Matthew O'Brien, a lawyer working with Malone, got a court order allowing him into the workhouse to check on his clients. There he found Burns in her dark cell, wrapped in a blanket as her clothes had been violently stripped from her. It was all he needed to argue that the suffragists were being subjected to cruel and unusual punishment. At a hearing a week later in U.S. district court, with Burns and Lewis in the room but too weak to testify, Judge Edmund Waddill ordered all suffragists transferred from Occoquan to the district jail, where Paul had been moved.

Wilson's political reputation was taking a big hit, according to the torrent of letters and telegrams flowing toward the White House. Some writers made plain to Wilson that Democrats would lose the next election over the maltreatment

POLITICAL PRISONERS

Mary Winsor's sign (below) decries the treatment of imprisoned activists. Winsor would later be arrested and jailed at Occoquan Workhouse in autumn 1917.

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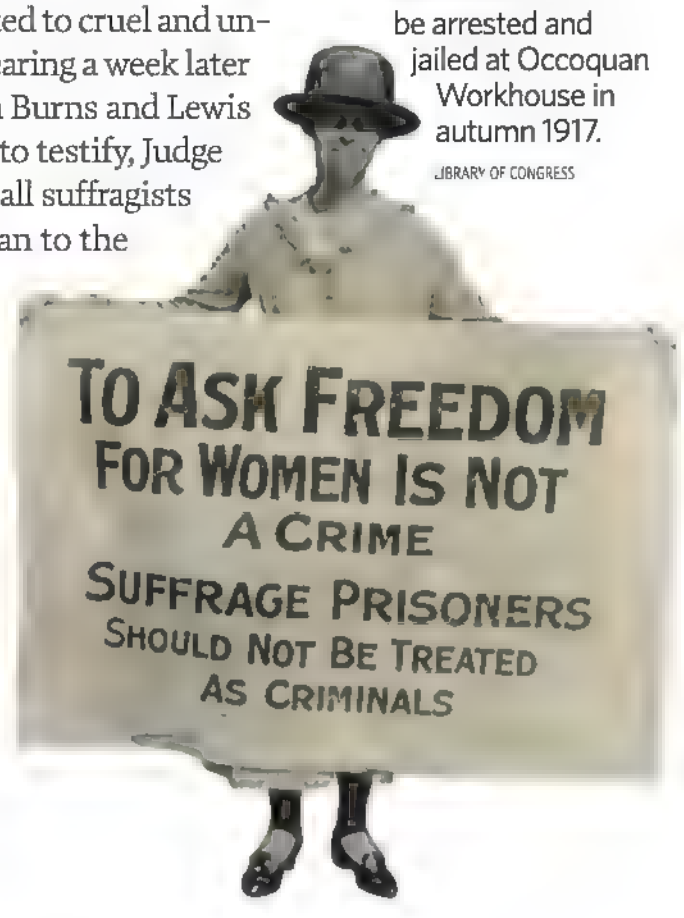


Sixty-sixth Congress of the United States of America;

At the First Session,

Begun and held at the City of Washington on Monday, the nineteenth day of May, one thousand nine hundred and nineteen.

JOINT RESOLUTION

Proposing an amendment to the Constitution extending the right of suffrage to women.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled (two-thirds of each House concurring therein), That the following article is proposed as an amendment to the Constitution, which shall be valid to all intents and purposes as part of the Constitution when ratified by the legislatures of three-fourths of the several States.

"ARTICLE ————.

"The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of sex.

"Congress shall have power to enforce this article by appropriate legislation."

Speaker of the House of Representatives.

Vice President of the United States and President of the Senate.

THE 19TH AMENDMENT

VOTES FOR WOMEN, AT LAST

Woodrow Wilson's change of heart about woman suffrage came in 1918, but it would take Congress another year to pass the Susan B. Anthony amendment. In his annual address to Congress on May 20, 1919, Wilson uttered the words Alice Paul had been asking of him from the beginning: "And what shall we say of the women—of their instant intelligence, quickening every task that they touched; their capacity for organization and cooperation, which gave their action discipline and enhanced the effectiveness of everything they attempted the least tribute we can pay them is to make them equals of men in political rights as they have proved themselves their equals in every field of practical work they have entered." The amendment soundly passed in the House on May 21 (304-89) and in the Senate (56-25) on June 4, 1919. The following August, after 36 states had ratified it, the 19th Amendment and women's right to vote was proclaimed by the secretary of state to now be part of the United States Constitution.

WOMEN AND MEN

A joint resolution of Congress (above) passed in June 1919 and was ratified in August 1920. The amendment protects all American citizens' right to vote—regardless of sex.

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION

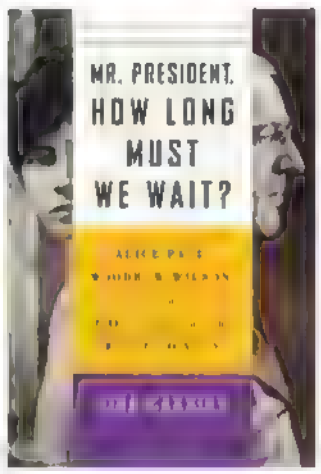
issue. A week after the Waddill hearing, all the women were granted release. By November 28, Paul, Burns, and 20 other protesters were freed. Now it was Wilson who was handcuffed in a difficult position.

On January 9, 1918, Woodrow Wilson announced his support for the Susan B. Anthony amendment as the House stood poised to vote on it. Wilson said that his personal position had not changed—leaving the states to decide would be the "proper and orderly way of dealing with the question." But, he said, America, and the world, had changed. There was growing public sentiment in favor of votes for women, and the nation's stature as a beacon of democracy had grown.

When they heard the news, the suffragists were elated. Paul, mostly recovered from her last hunger strike, was also upbeat. In a statement to the press, she said, "It is difficult to express our gratification at the President's stand. For four years we have striven to secure his support for the national amendment, for we knew that this, and perhaps it alone, would ensure us success."

The Susan B. Anthony amendment would not pass in Congress until 1919. Suffragists would spend much of the following year focusing their efforts on ratification in the states. The determination and persistence of the Silent Sentinels turned President Wilson from foe to ally, and would bring the final push for woman suffrage across the finish line in August 1920, when the 19th Amendment became the law of the land in the United States.

JOURNALIST **TINA CASSIDY** WRITES ABOUT WOMEN AND CULTURE AND IS THE AUTHOR OF **BIRTH: THE SURPRISING HISTORY OF HOW WE ARE BORN**; AND **JACKIE AFTER O.**



From ***Mr. President, How Long Must We Wait?: Alice Paul, Woodrow Wilson, and the Fight for the Right to Vote*** by Tina Cassidy. Copyright © 2019 by Tina Cassidy
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SUFFRAGISTS CELEBRATE

Alice Paul unfurls a banner at the National Woman's Party headquarters in Washington, D.C., to honor the ratification of the 19th Amendment in August 1920.

STOCK MONTAGE/GETTY IMAGES

PLAN OF ATTACK
Focusing his gaze on Japan, Maj. Gen. Leslie R. Groves, head of the Manhattan Project that built the first atomic bombs, studies a map of the Pacific theater in summer 1945.
AGE FOTOSTOCK

THE FIRST BOMBS

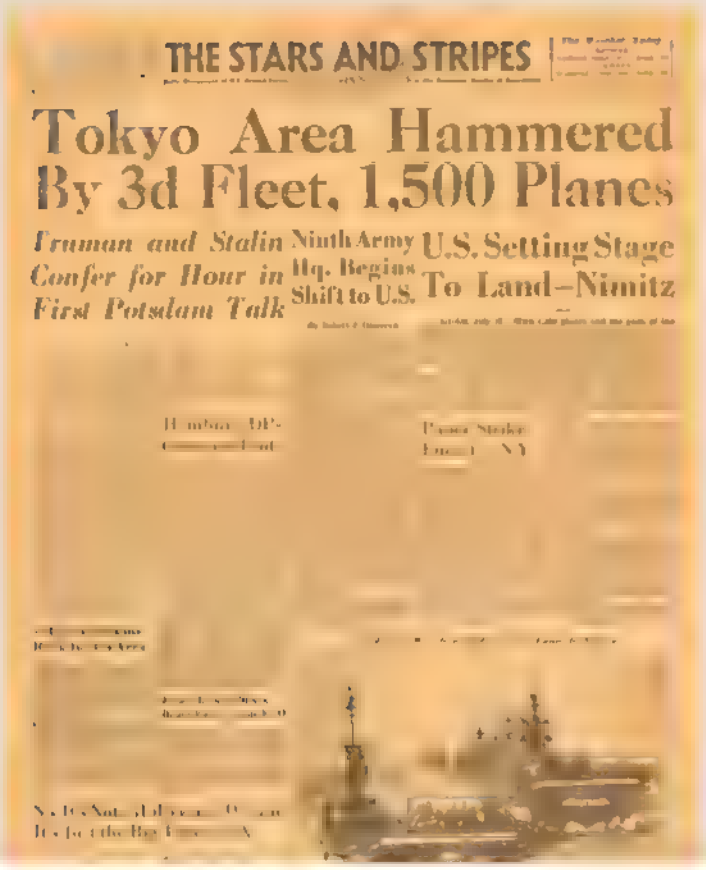
IN SUMMER 1945 THE UNITED STATES PLANNED TO USE ITS DEVASTATING SECRET WEAPON—THE ATOMIC BOMB—AGAINST JAPAN. UP UNTIL THE MOMENT OF JAPAN'S SURRENDER, U.S. OFFICIALS WERE DELIBERATING OVER THE NUMBER OF STRIKES AND TARGETS IN AN ATTACK PLAN THAT INCLUDED HIROSHIMA, NAGASAKI, AND MORE.

ALEX WELLERSTEIN

KORYAKSKIY KHREBET
B E R I N G
C I F I C

Ending the War

ON JULY 16, 1945, the world's first atomic bomb exploded. One day later, the president of the United States learned of the Trinity test as the Potsdam Conference was beginning. Allied leadership—U.S. president Harry Truman, Soviet premier Joseph Stalin, and British prime minister Winston Churchill—were meeting in the Soviet zone of now occupied Germany to determine their next steps in Europe in the postwar era. Truman told Stalin that the United States possessed a "new weapon of unusual destructive force," to which Stalin replied that he hoped Truman would make "good use of it against the Japanese." Ten days after Trinity, the United States, Great Britain, and China issued a declaration calling for the unconditional surrender of Japan (the U.S.S.R. had not yet declared war on Japan, so it did not participate). The Potsdam Declaration promised "prompt and utter destruction" if Japan rejected their ultimatum.


THE STARS AND STRIPES

Tokyo Area Hammered By 3d Fleet, 1,500 Planes

Truman and Stalin Confer for Hour in First Potsdam Talk

Ninth Army Hq. Begins Shift to U.S.

U.S. Setting Stage To Land—Nimitz

ALLIED AIR STRIKES AS THE POTSDAM CONFERENCE BEGAN IN JULY 1945, ALLIED FORCES CONTINUED A FIREBOMBING CAMPAIGN AGAINST THE JAPANESE BEGUN SEVERAL MONTHS EARLIER.

JOHN FROST NEWSPAPERS/ALAMY

THE LAST DAYS OF WORLD WAR II

JULY 16, 1945

The world's first atomic bomb, "Gadget," is detonated at the Trinity site in New Mexico, the successful culmination of the Manhattan Project.

JULY 26, 1945

The United States, Great Britain, and China issue the Potsdam Declaration, calling for Japan's unconditional surrender. Japan rejects their terms.

AUGUST 6, 1945

The United States drops an atomic bomb on the city of Hiroshima. Two days later, the Soviet Union will declare war on Japan and invade Manchuria.

AUGUST 9, 1945

A second atomic bomb is dropped on Japan. Kokura had been the intended target, but poor visibility over the city caused U.S. pilots to turn to Nagasaki.

AUGUST 10, 1945

Maj. Gen. Leslie R. Groves outlines to Chief of Staff George Marshall a schedule for when a third atomic bomb would be ready to deploy against Japan.

AUGUST 14–15, 1945

Japan unconditionally surrenders to the Allies. Emperor Hirohito announces the war's end via a radio address to the public.

SEPTEMBER 2, 1945

World War II officially comes to an end when the Japanese Instrument for Surrender is signed aboard the U.S.S. *Missouri*.

FROZEN AT 8:15, THE HANDS OF A WATCH RECOVERED FROM HIROSHIMA (RIGHT) STOPPED WHEN THE ATOMIC BOMB FELL ON THE CITY.

SCIENCE SOURCE/BRIAN BRAKE/ALBUM

Warfare changed forever in the summer of 1945, when the United States detonated the world's first atomic bombs. One was tested in the New Mexico desert, and the other two devastated the Japanese cities of Hiroshima and Nagasaki. Entire cities and their populations could now be wiped out with one strike. But until Japan's final surrender offer, five days after the Nagasaki bombing, the atomic bomb's reputation as a "war ender" would not take hold. During that time, the question of how the next atomic bomb would be used was a real one.

One of the most persistent claims about the end of World War II is that the United States

had no more atomic bombs after the second attack and that President Harry Truman was bluffing when he promised to drop more on Japan if it did not unconditionally surrender. But this is a myth: It was no bluff.

In the closing months of World War II, the United States was producing as many atomic bombs as it could. Days away from having another bomb for a third attack, the United States was close to preparing it for deployment before the Japanese surrendered. Just hours before hearing of Japan's final surrender on August 14, 1945, Truman had ruefully told a British diplomat that he had "no alternative" but to order a third atomic bomb attack. Had World War II lasted a few more days, the odds of a third bomb—and several more—were very high.

Building the Bombs

The first atomic weapons were built by the Manhattan Project, a top secret effort authorized by President Franklin Roosevelt in late 1942. Hundreds of sites and facilities spanned the country (and a few were in other countries), all collaborating to build this new weapon.

The most difficult part of the process, making the fuel for the bombs—enriched uranium and plutonium—consumed almost all of the expense and labor. In July 1945 the United States had produced enough fuel for three complete bombs—"Gadget" (plutonium), "Little Boy" (uranium), and "Fat Man" (plutonium)—with almost enough plutonium left over for a fourth. The Manhattan Project's factories could produce enough fuel for a little under three and

TEAM MEETING
Soviet premier Joseph Stalin (left), U.S. president Harry S. Truman (center), and British prime minister Winston Churchill (right) gather on the opening day of the Potsdam Conference on July 17, 1945.

GRANGER, NYC/ALBUM

KEEPING CONTROL
Scientists monitored reactors from control rooms (above) at Hanford, Washington, which made fuel for three of the first atomic weapons.

SIM CHAN/MAGNUM PHOTOS/CONTACTOPHOTO

a half bombs per month, but tweaks to the designs of the bombs were being considered that would allow them, if the war continued, to produce several more bombs per month.

On July 16, 1945, Gadget was detonated in the New Mexico desert in a test called Trinity. It was an unambiguous success: The explosion was several times more powerful than scientists had predicted. Just after Trinity, Maj. Gen. Leslie R. Groves, the military head of the Manhattan Project, predicted to J. Robert Oppenheimer, the scientific director of the project, that it would probably require dropping not just two bombs but a third, "in accordance with our original plans." He even thought that perhaps as many as four bombings could be necessary.

General Groves's view was not unusual. The U.S. plans never projected that two atomic bombs would end the war; officials felt they would need to use atomic warfare and invade. They believed that the atomic bomb would be a potent new weapon, but it was unclear whether it would be viewed as a decisive one. How the atomic bombs would affect the Japanese cabinet's will to fight was a complete unknown.

The Americans knew from intercepted Japanese foreign intelligence communications that the Japanese high cabinet was divided. The Japanese militarists, who held a cabinet majority in mid-1945, believed that they should "bleed" the Americans, in the vain hope that the U.S. public would tire of war. A "peace" faction saw this tactic for the folly it was, and that it would mean the destruction of Japan.

Manhattan Project

BUILDING THE FIRST ATOMIC BOMBS was a massive practical endeavor spread out over a great geographic distance. Given the top priority of all wartime weapons projects, the Manhattan Project consumed vast resources: Nearly half of all Army construction and steel was used by the project at its peak, and over the course of its existence it employed some 500,000 people. Thousands of scientists, many of them Nobel laureates, shaped theory into reality, while hundreds of locations and facilities spanning the United States and Canada (as well as several other countries) provided the research, materials, parts manufacturing, and testing sites for the entire project.

MAKING THE FUEL FOR THE BOMBS happened at two major sites. This process consumed almost all of the project's expense and labor. The Hiroshima bomb, "Little Boy," used highly enriched uranium, which had to be separated, atom by atom, from thousands of tons of raw, natural mined material. This work was done in a "secret city" created by the U.S. Army at "Site X" in Oak Ridge, Tennessee. The Nagasaki bomb, "Fat Man," used plutonium, a man-made element created inside three industrial-size nuclear reactors, the first ever constructed, built on the banks of the Columbia River in rural Washington State, at "Site W," the Hanford Engineer Works. The timing of the Manhattan Project, and the size of its atomic stockpile, was determined almost entirely by the production rates of Oak Ridge and Hanford.

THE MOST SENSITIVE WORK was conducted at a third major site: the top secret laboratory at "Site Y" in Los Alamos, New Mexico. Employing more than 2,500 people, including a brain trust of the world's leading scientists, Los Alamos was where the bombs were designed. Selected for its remoteness, the facility was more easily secured than a university in a big city.

If the United States wanted Japan to surrender, it had to find a way to overcome the militarist domination. Conventional bombing alone would not do the trick. U.S. firebombing had routinized destruction of Japanese cities since March 1945. The first massive nighttime raids against Tokyo killed more than 100,000 and left a million people homeless over the course of one night. By July the United States had bombed more than 60 other Japanese cities in this way, with no appreciable change in the Japanese stance on surrender. If the atomic bomb would have an immediate effect, it had to be understood as a revolutionary weapon.

Choosing a Target

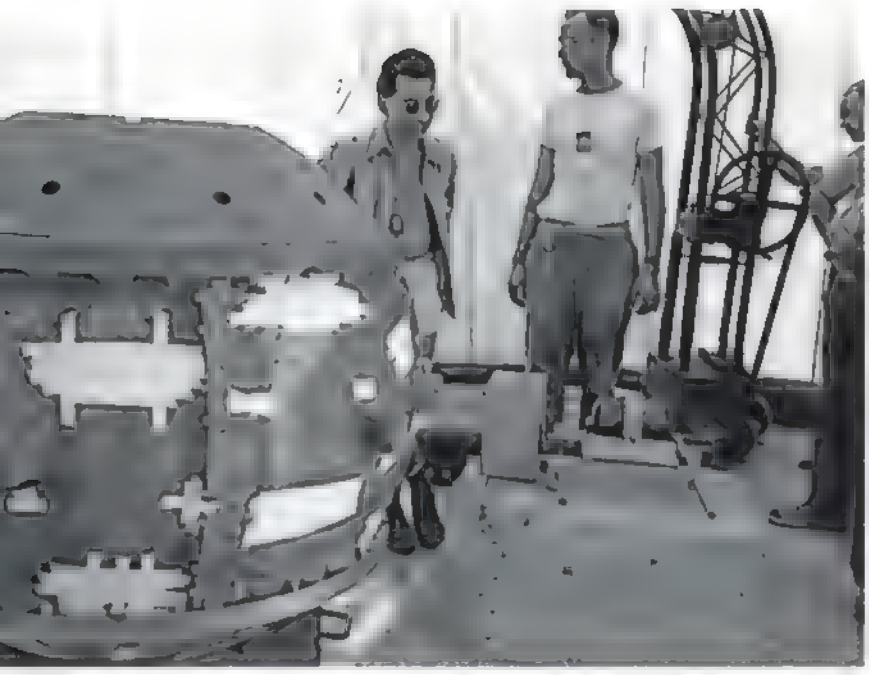
The American planners wanted the first use of the atomic bomb to make its implications

NG MAPS

clear, and so they gave careful consideration to how it would first be used. The Manhattan Project's Target Committee, led by U.S. scientists and key members of the military, met in spring 1945 to discuss the cities that might become the first targets. At the first meeting in late April 1945 (about a week before Germany's surrender), they defined candidates as "large urban areas of not less than 3 miles in diameter existing in the larger populated areas . . . between the Japanese cities of Tokyo and Nagasaki . . . [and] should have high strategic value." Specifically they considered 17 possibilities: Tokyo Bay, Kawasaki, Yokohama, Nagoya, Osaka, Kobe, Kyoto, Hiroshima, Kure, Yamata, Kokura, Shimosenka, Yamaguchi, Kumamoto, Fukuoka, Nagasaki, and Sasebo.

In early May 1945 after another Target Committee meeting, the list had been amended and revised. It now included just five cities: Kyoto, Hiroshima, Yokohama, Kokura, and Niigata (in order of interest). Kyoto was the top pick as it was a large city and as yet untouched by bombing. Hiroshima, another untouched city, was added for the large military base in its center and its geography: The surrounding hills would "focus" the blast and increase its destructive power.

By the end of June, the Committee put Kyoto, Hiroshima, Kokura, and Niigata on a list of "reserved targets" to "protect" them from any future firebombing raids (firebombed at the end of May, Yokohama was no longer eligible). Kyoto was removed as a candidate for any attack—atomic or otherwise—shortly afterward because Secretary of War Henry Stimson, for



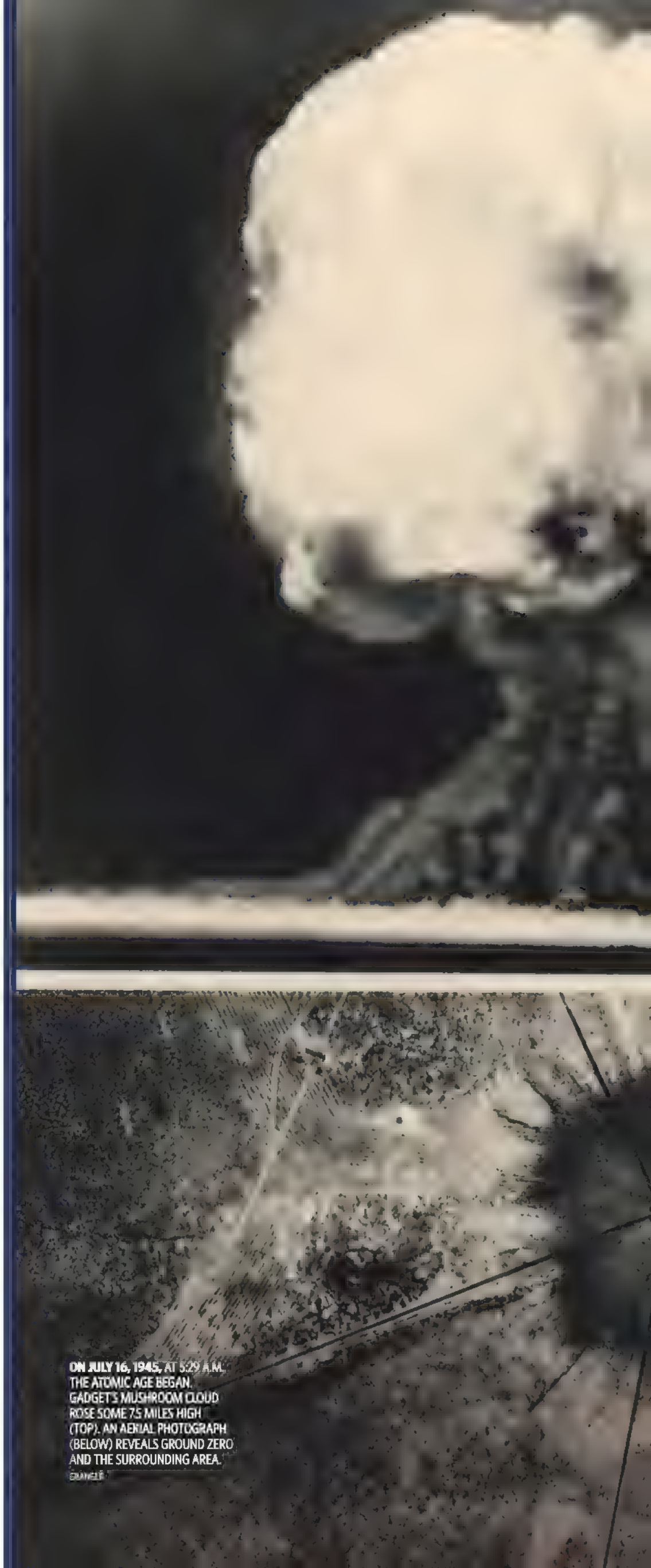
TEST PREPARATION
Standing next to the plug (lower right) containing the plutonium core that would power the world's first nuclear explosion, scientists Louis Slotin (left) and Herbert Lehr (right) wait to insert it into "Gadget" at the Trinity test site.
SCIENCE HISTORY IMAGES/ALAMY

reasons both strategic and sentimental, decided to save the former Japanese capital. Groves protested vigorously, repeatedly arguing that Kyoto was a valid and important target, but Stimson ultimately convinced Truman to agree with him. Kyoto was off the list.

At the Potsdam Conference in July 1945, Truman and Stimson learned of the Trinity test, which electrified the president. Previously he had been fairly disinterested in the scientific tinkering taking place in New Mexico, but he now saw this new weapon as a means of waging war against Japan and sending a message to the Soviet Union.

The target list was being finalized in encrypted communications between Stimson, at Potsdam, and Groves, in Washington, D.C. Groves decided each primary target had to have viable backups in case of foul weather or other complications. Maj. Gen. Lauris Norstad, head of target planning for the Army Air Forces, supplied them. With Kyoto removed, they needed another backup in the area of Hiroshima and Kokura. Though it had unfavorable topography and a POW camp, Nagasaki, a port city on the Japanese island of Kyushu that was home to two munitions factories, was added to the list.

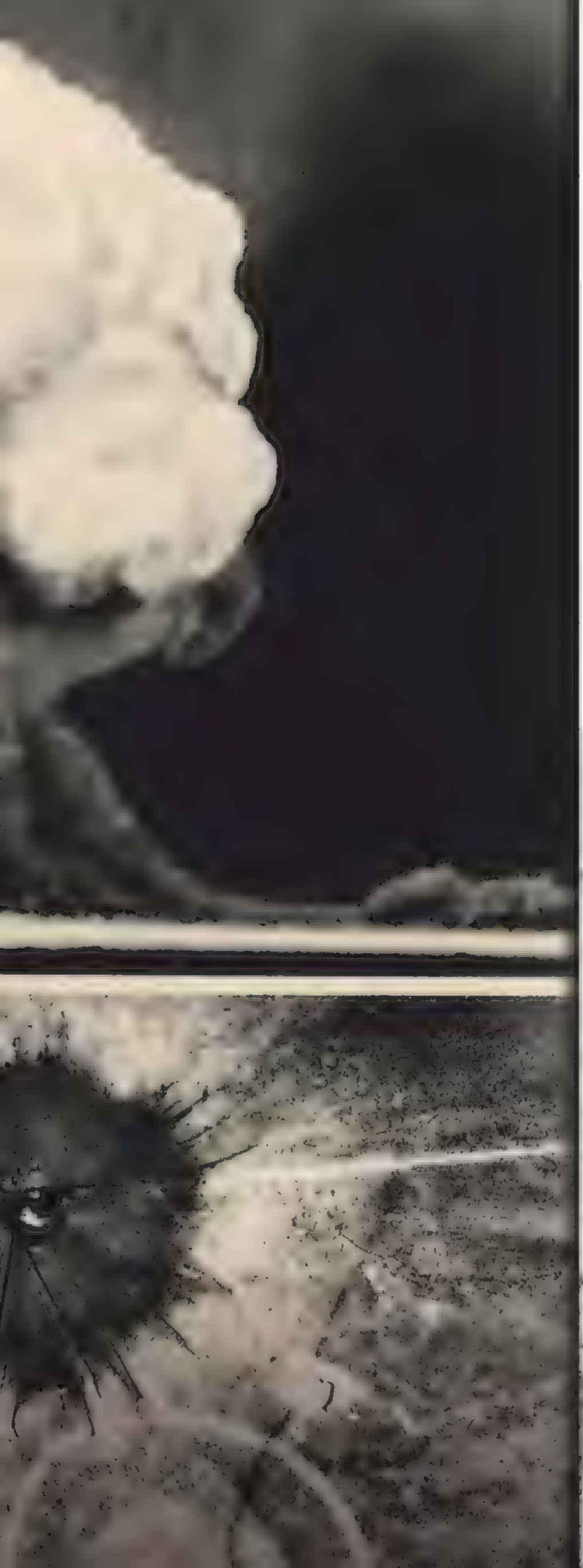
The final target order was drafted by Groves, shown to Truman, approved by Stimson and Gen. George Marshall, chief of staff of the U.S. Army, and issued on July 25. A directive was



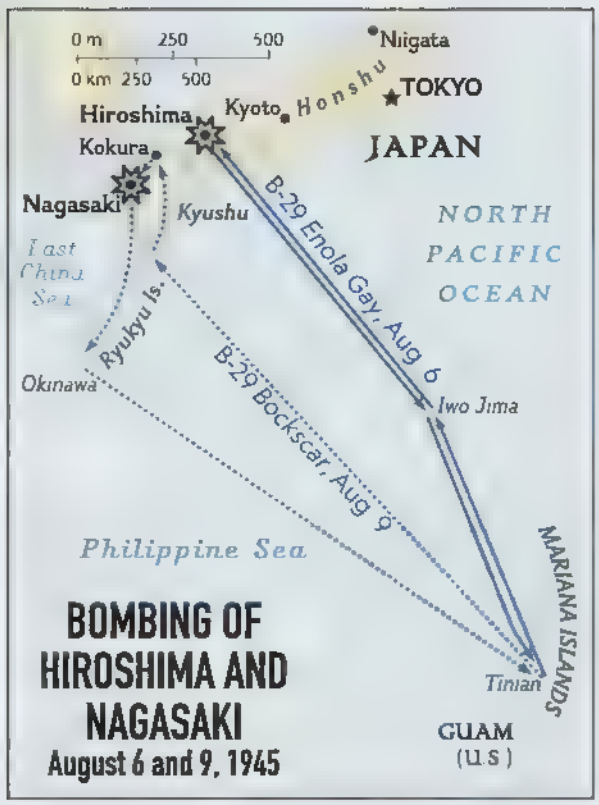
ON JULY 16, 1945, AT 5:29 A.M. THE ATOMIC AGE BEGAN. GADGET'S MUSHROOM CLOUD ROSE SOME 7.5 MILES HIGH (TOP). AN AERIAL PHOTOGRAPH (BELOW) REVEALS GROUND ZERO AND THE SURROUNDING AREA.
ERANGLE

In Their Own Words

AFTER THE TRINITY TEST, the two men heading up the Manhattan Project were pleased by its success yet awed by its power. General Groves, the military head of the Manhattan Project, recalled the moment in his 1962 memoir, *Now It Can Be Told*: "I planned to discuss and settle a number of matters involved in our operations in Japan . . . these plans proved utterly impracticable, for no one who had witnessed the test was in a frame of mind to discuss anything. The reaction to success was simply too great." Robert Oppenheimer, the scientific director of the project, remembered: "We knew the world would not be the same. A few people laughed, a few people cried, most people were silent. I remembered the line from the Hindu scripture, the *Bhagavad-Gita*: Vishnu is trying to persuade the Prince that he should do his duty and to impress him takes on his multi-armed form and says, 'Now, I am become Death, the destroyer of worlds.' I suppose we all felt that one way or another."



ATOMIC ARCHITECTS OPPENHEIMER (LEFT) AND [illegible] (RIGHT) TOUR THE NEW MEXICO TEST SITE A WEEK AFTER THE TRINITY EXPLOSION ON JULY 16, 1945



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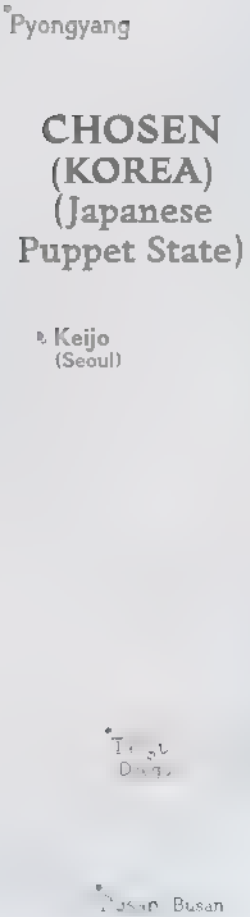


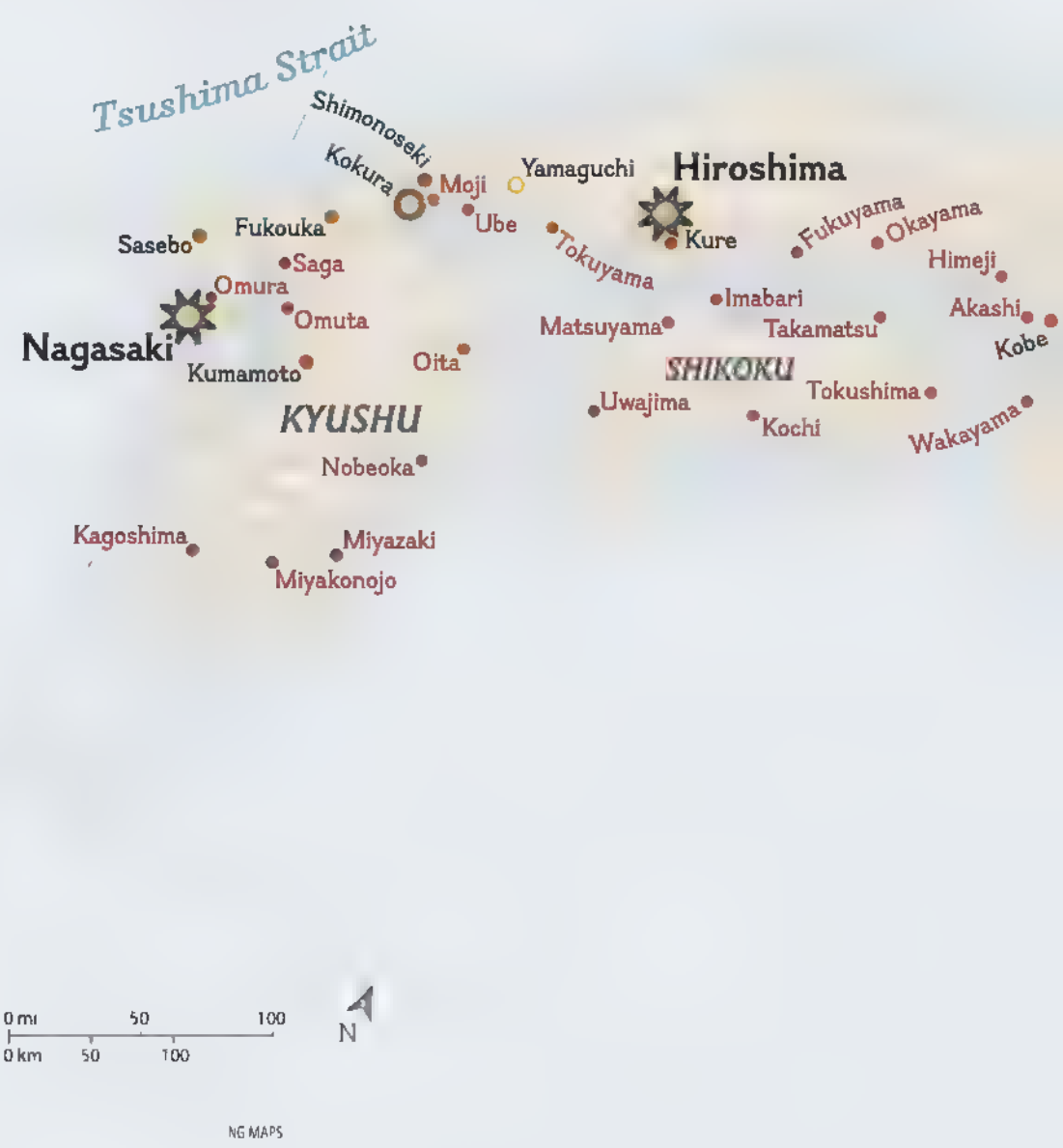
Yellow Sea

Airstrikes Against Japan

Allied forces had been conducting limited air raids over Japan starting in 1942 but ramped up their efforts in 1944 with the capture of the Mariana Islands and the introduction of the B-29 Superfortress.

MAJ. GEN. CURTIS LEMAY was the chief architect of the firebombing raids against Japan that first launched from Tinian Island. Starting in March 1945, U.S. forces launched a series of devastating nighttime attacks on Japanese cities. One of the first cities hit was Tokyo: More than 300 B-29s rained down bombs during the night of March 9-10, killing more than 100,000 people in the inferno. More than 60 other Japanese cities would suffer the same fate between March and the war's end in August. The total number of fatalities has been difficult to pinpoint: Some place the figure as low as 300,000, while others believe it could be as many as 500,000 people.

WHEN U.S. OFFICIALS were determining potential targets for the atomic bomb in spring 1945, they compiled a list (far right) of large urban areas that needed to be both free of firebombing and home to industry. By the time the atomic bombs were ready to use, the list had been narrowed to four: Hiroshima, Kokura, Nagasaki, and Niigata. Two specialized B-29s—outfitted to carry the new weapons—would take off from Tinian and unleash fury from above.



NG MAPS

U.S.S.R.

- Firebombed cities
  March - August 1945
- Preliminary candidates for atomic strike
  April 1945
- Revised candidates for atomic strike
  May 1945
- Final targets for the atomic bomb
  July 1945
- Atomic bomb attacks:
  Hiroshima, August 6, 1945
  Nagasaki, August 9, 1945

Sapporo
HOKKAIDO
Aomori
Sea of Japan
(East Sea)
PACIFIC
OCEAN
JAPAN
HONSHU
Niigata
Sendai
Nagaoka
Toyama
Fukui
Tsuruga
Nishinomiya
Amagasaki
Ogaki
Gifu
Kyoto
Kuwana
Ichinomiya
Yawata
Nagoya
Osaka
Sakai
Tsu
Okazaki
Yokkaichi
Toyohashi
Ujiyamada
Hamamatsu
Shizuoka
Shimizu
Numazu
Isezaki
Yokohama
Hachioji
TOKYO
Chiba
Hiratsuka
Kawasaki
Choshi
Maebashi
Utsunomiya
Kumagaya
Hitachi
Mito
Kofu
Izu
Islands

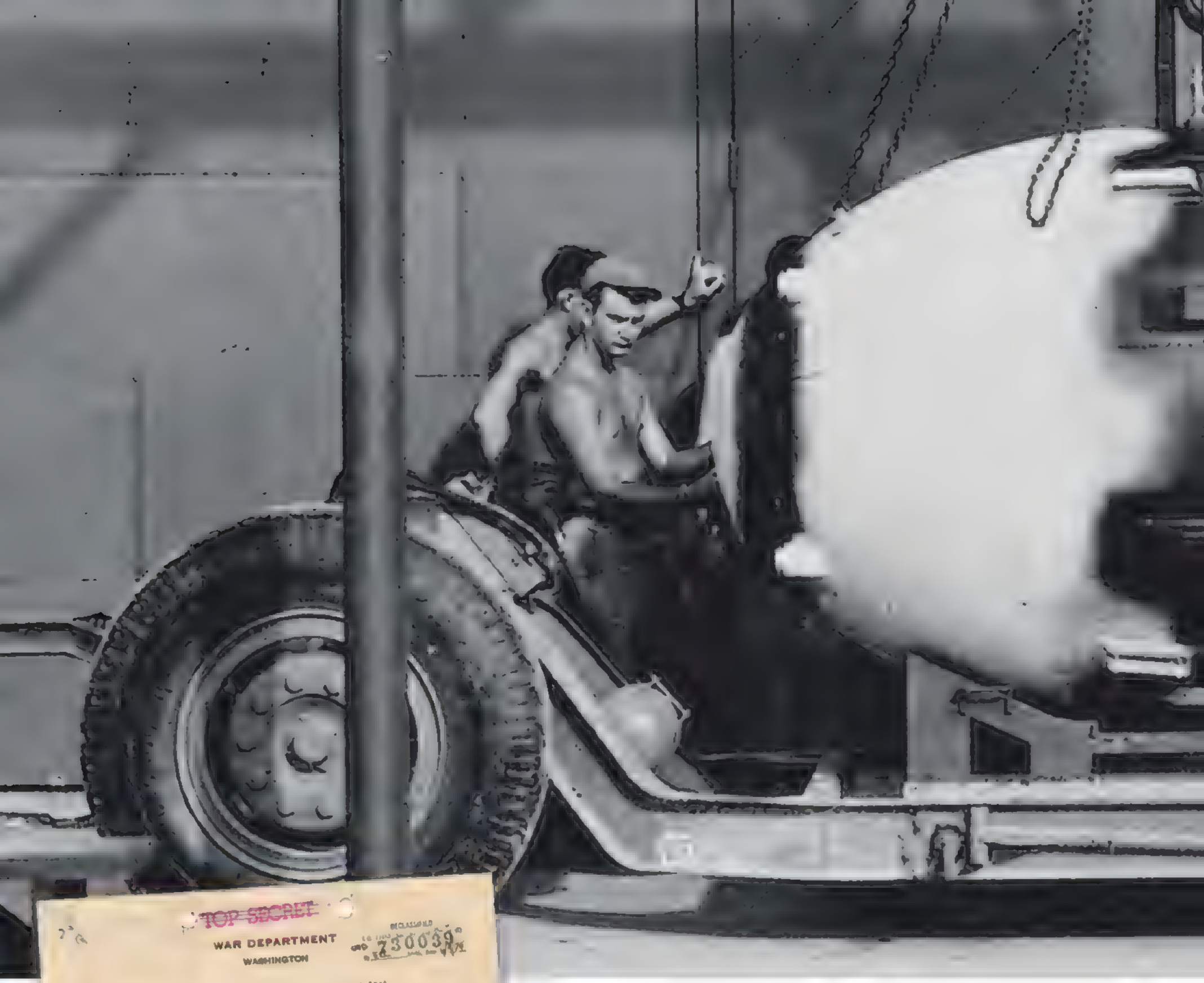
2. The following are suggested as possible appropriate areas:

a. Tokyo Bay
b. Kamasaki
c. Yokahama
d. Nagoya
e. Osake
f. Kobe
g. Kyoto
h. Hiroshima
i. Kure
j. Yamata
k. Kokura
l. Shimonseka
m. Yamaguchi
n. Kumamoto
o. Fukuoka
p. Nagasaki
q. Sasebo

3. The destruction will primarily be accomplished by the air blast effect and the selection should be made with this thought in mind.

An excerpt of the April 1945 document outlining an initial list of Japanese targets for attack. (Variant spellings of city names were due to alternate translations.)

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION, WASHINGTON D.C.



TOP SECRET

WAR DEPARTMENT
WASHINGTON

10 August 1945.

MEMORANDUM TO: Chief of Staff.

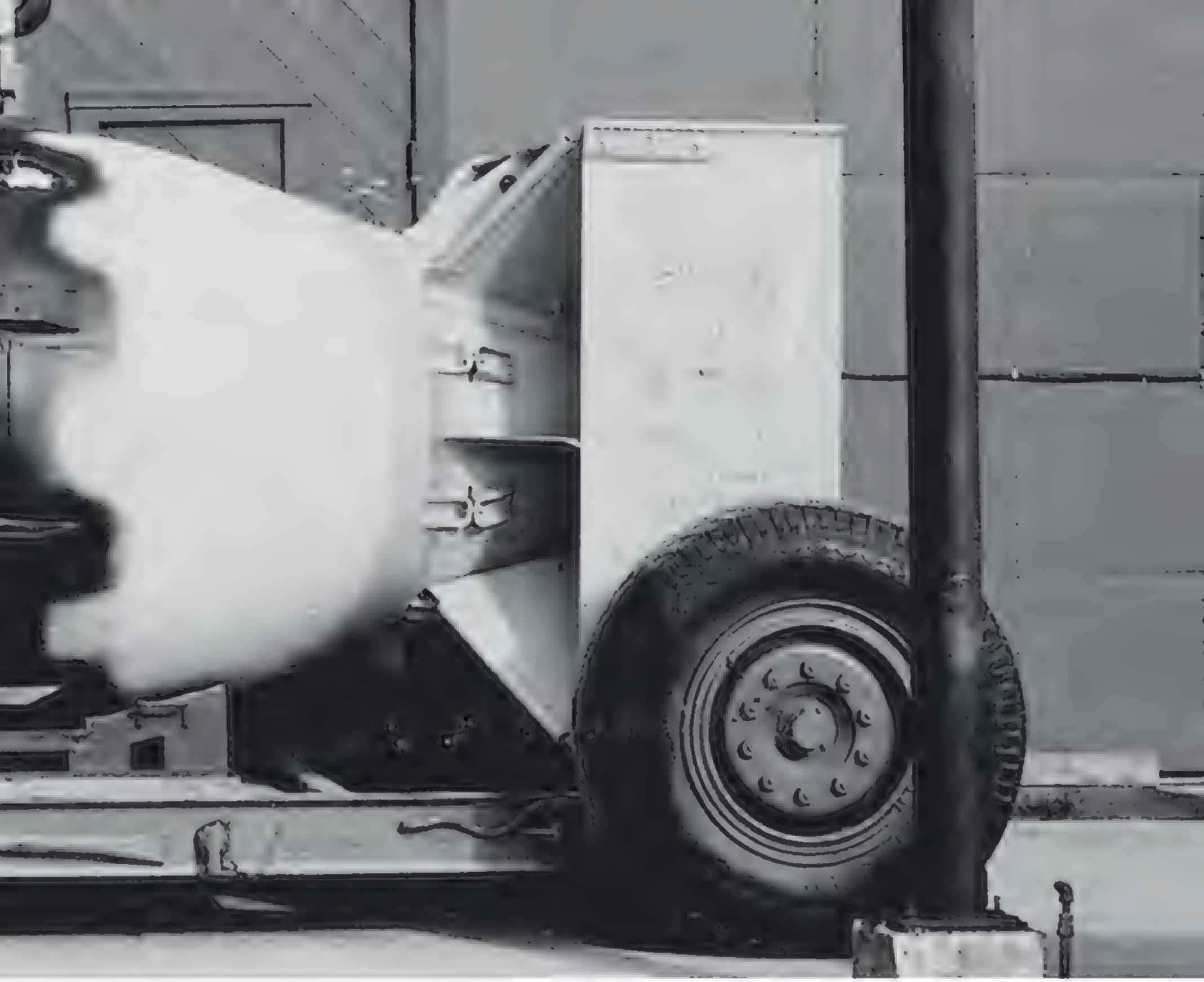
The next bomb of the implosion type had been scheduled to be ready for delivery on the target on the first [illegible] after 24 August 1945. We have points [illegible] August the final components. [illegible] are [illegible] seem difficulties in manufacture, in transportation to the theatre or after arrival in the theatre, the bomb should be ready [illegible] on the first suitable weather after 17 or [illegible].

TOP SECRET

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION, WASHINGTON, D.C.

A THIRD BOMB, CHIEF OF STAFF GEORGE MARSHALL INFORMS GENERAL GROVES, CANNOT BE DEPLOYED WITHOUT THE PRESIDENT'S AUTHORITY.

sent from Lt. Gen. Thomas Handy, deputy chief of staff, to Gen. Carl Spaatz, commander of the Strategic Air Forces in the Pacific. It said that "after about 3 August 1945," the 20th Air Force would deliver its first "special bomb" on Hiroshima, Kokura, Niigata, or Nagasaki (an earlier draft made it clear this was the order of priority). The bombing would be done visually (not by radar), and the bomber would be accompanied only by a few observation aircraft. Furthermore, "additional bombs will be delivered on the above targets as soon as made ready by the project staff." New targets would be chosen once the first four were eliminated. It was not an order to drop one atomic bomb; it was an order to permit the dropping of as many atomic bombs that were or would become available.



HANDLE WITH CARE
The massive plutonium "Fat Man" bomb is lowered to a carriage on Tinian Island before being loaded onto the B-29, *Bockscar*. The United States dropped Fat Man on the Japanese city of Nagasaki on August 9, 1945.

UNIVERSAL HISTORY ARCHIVE/GETTY IMAGES

The First Attack

The launching point for the heavy bombing attacks against Japan, including both the atomic and firebombing raids, was the small island of Tinian in the Northern Marianas. Captured from the Japanese in summer 1944, Tinian was turned into an island-size air base, the largest in the entire war.

Starting in May 1945, around the same time that target planning had begun, infrastructure to assemble atomic bombs was set up on Tinian. Plans were drawn up to get the valuable bomb components to the island without mishap. On July 16, the day of the Trinity test, components of Little Boy began their journey to Tinian. All arrived by July 29, and the bomb was ready to drop at the end of the month. The Fat Man materials all arrived by August 2, and assembly of the second bomb was finished on August 7.

Orders specified that the targets needed to be sighted visually, out of fear that errors could be introduced by radar targeting. (It intuitively does not seem like one could "miss" with an atomic bomb, but for weapons the size of those used in World War II, being off by several miles—very easy with radar guidance—could mean the difference between hitting or grazing a target.)

Visual sighting meant that the skies had to be relatively clear, so every day lone B-29s would fly to targets and radio back weather reports. On August 5, skies were finally deemed clear enough for a bombing run the next day. That night, Little Boy was loaded into a B-29

ENOLA GAY
The B-29 *Enola Gay* conveyed the "Little Boy" uranium bomb that was dropped on Hiroshima, Japan, on August 6, 1945.
WORLD HISTORY ARCHIVE/ACI

bomber, the *Enola Gay,* and sent to bomb a city, either Hiroshima, Kokura, or Nagasaki.

Around 1 a.m. on August 6, the plane took off. Cloud cover was light over Hiroshima, and shortly after 8:00 a.m., the city came into sight. At 8:15, Little Boy dropped, fell for 44 seconds, and then detonated with the force of roughly 15,000 tons of TNT. Almost instantly, Hiroshima erupted in a maelstrom of fire and destruction; tens of thousands would die within minutes, and perhaps 100,000 more would succumb in the aftermath. The *Enola Gay* observed this from 32,700 feet, circled for less than an hour, and headed back to Tinian.

The Second Attack

When Truman heard about the run on Hiroshima, he was traveling home from Potsdam on the battleship U.S.S. *Missouri*. He was overjoyed at its success, announcing that it was "the greatest thing in history." The news of the atomic bomb was almost immediately released to the press, and a radio announcement was broadcast to Japan itself.

The Japanese military knew that Hiroshima had come under some kind of major attack on August 6, but did not know its special nature. After hearing about the American radio announcement, the high command met and agreed that they should send a scientific team to investigate. A top Japanese nuclear physicist, Professor Yoshio Nishina, reported back from Hiroshima on August 8 that there were "almost no buildings left standing," and that, from what he could tell, "the so-called new type bomb is actually an atomic bomb."

As the Japanese were confirming what happened in Hiroshima, the next bombing mission was already beginning. On August 8, weather forecasters were predicting that August 10, the planned date for the second attack, was going to be unfavorable. Instead, U.S. officials on Tinian, without consulting anyone in Washington, D.C. (including Truman or even Stimson), decided that they had the authority under the launch order to use the next weapon. So in a marathon session, they assembled Fat Man, loaded it into another B-29, the *Bockscar,* and sent it on its way.

Kokura, an arsenal town on the northern end of the southern Japanese island of Kyushu, was the primary target. Visibility there was terrible, as Kokura was covered in clouds or smoke (it may have been both: The nearby city of Yawata had been firebombed the day

DEVASTATION
Hiroshima was still in ruins in March 1946 (above). Exact death counts are impossible to obtain, but experts estimate as many as 100,000 died from the immediate explosion and the aftereffects of the bomb.

UNIVERSAL IMAGES GROUP, UNIVERSAL HISTORY ARCHIVE/UIG/ALBUM

before). After spending 45 minutes fruitlessly searching for Kokura, the *Bockscar* proceeded to Nagasaki. At 11:02 a.m. on August 9, 1945, Fat Man exploded over Nagasaki with the violence of 20,000 tons of TNT. More than 70,000 people were killed in the immediate attack. *Bockscar* briefly surveyed the damage and then headed back to base.

The Japanese high command was meeting on August 9 to discuss the Soviet Union's recent declaration of war on Japan and its subsequent invasion of Manchuria when they learned of the attack on Nagasaki. It is hard to know if the Japanese believed more atomic attacks would be coming. Certainly the use of a second bomb dashed any hopes that the United States only had one. But neither the second atomic bomb nor the Soviet invasion was enough to push the Japanese to unconditional surrender: Japanese officials were prepared to offer only a conditional surrender to the Americans, preserving the role and power of the emperor.

Waiting and Preparing

In the U.S. capital things were chaotic. On August 10, Japan's offer of conditional surrender was scrutinized closely by Truman and his Cabinet, while General Groves sent a letter to General Marshall, the chief of staff, reporting that "the next bomb" would be ready earlier than expected. In Los Alamos, New Mexico, scientists were working around the clock finalizing the components for the next bomb to ship to Tinian. They would be shipping the final components from New Mexico on August 12 or 13, and would be ready to drop it on a Japanese city in about a week.

Truman was informed of this, and his response was immediate. As Marshall wrote back to Groves: "It is not to be released over Japan without express authority from the President." Truman may have had a very peripheral role in the ordering of the use of the atomic bomb—his main role, as Groves later put it, was not to interfere with plans already in motion—but he played a direct role in the stopping of the use of further bombs.

Why did Truman, who had proclaimed the Hiroshima attack to be "the greatest thing in history," suddenly order the stoppage? Some believe he was worried that another atomic bomb would disrupt efforts to end the war, not speed them along. Other historians believe Truman wanted to stop the carnage. He told his Cabinet that morning, as recounted in the diary of Henry Wallace, his secretary of commerce and the former vice president, that he ordered the stoppage because "the thought of wiping out another 100,000 people was too horrible. He didn't like the idea of killing, as he said, 'all those kids.'"

Either way, Truman was seeking to regain control, having permitted, perhaps without realizing it, the military to consider itself totally in control of how these new weapons would be used. He had known the first atomic attack was happening, but not the second. If a third was to happen, it would come from his direct order.

THE EMPEROR'S MESSAGE
On August 15, 1945, Japanese citizens listen to the radio broadcast of Emperor Hirohito announcing Japan's surrender and the end of the war.

THE ASAHI SHIMBUN/GETTY IMAGES

A Third Shot?

Japan's initial surrender offer was a promising sign, but not enough for Truman and his Cabinet. Only unconditional surrender would do, Truman replied. Several days of waiting—from August 10 to August 14—followed. Speculation in the American press and military was rampant about if and where more atomic bombs would fall.

After being told not to use the bomb, Groves called Oppenheimer in New Mexico the next day and told him not to ship the next plutonium core to Tinian. In the same discussion, though, Oppenheimer told Groves that he could report on their progress on a new weapon design, a "composite" implosion bomb that would use both plutonium and enriched uranium in one bomb, allowing them to improve their production rate dramatically.

Even though Truman had put a hold on atomic bombing, the leaders of the U.S. Army Air Forces still thought that more bombs would be needed. On August 10, General Spaatz telegrammed General Norstad, in target planning, to "strongly recommend" that the next atomic bomb target be Tokyo. "More destruction would be obtained from using a clean target," he wrote, "but it is believed that the psychological effect on the government officials [there] is more important at this time than destruction."

The same day he learned that his suggestion was "being considered on a high level." It promised that "final decisions" would be made in the next two days. The same day, Maj. Gen. Curtis LeMay, architect of the firebombing campaigns, put forward an urgent request to install facilities capable of assembling atomic bombs at Okinawa, perhaps anticipating the use of the weapon for the invasion of Japan.

On August 13, Secretary of War Stimson indicated that perhaps the "shipments" of nuclear materials to Tinian should resume. Groves was tasked with getting the most up-to-date information on the schedule of future bombings and making sure it was passed along to General Marshall. Marshall was wondering whether it made sense to use the bombs as they were ready, or whether

they should be collected and used for the invasion. The number of possibly dropped atomic bombs in such a situation was about a dozen. In any case, a third bomb, a representative of Groves's told a representative of Marshall's, was "ready to be shipped—waiting on order now."

On August 14, Spaatz continued to push Tokyo as the next target, recommending with "utmost urgency" that they transfer the third atomic bomb to Tinian "to be dropped on Tokyo." Again, he was told that the decision was still pending. Groves was told that the decision about whether to use another atomic bomb would be made the next day.

Later that afternoon, Truman met with the British ambassador and "remarked sadly" that since the Japanese seemed unwilling to surrender unconditionally, "he now had no alternative but to order an atomic bomb to be dropped on Tokyo." If he made the order, the operation would have taken place within days.

Surrender

But fortunately, it did not come to that. Not long after Truman talked with the British ambassador, on August 14, 1945, Japan announced its embrace of unconditional surrender. Historians still argue today about what exactly caused their change of heart, as the relative roles of the atomic bombs, the Soviet declaration of war, and internal Japanese forces are very difficult to disentangle, and all likely played a part.

The third bomb, and the others that may have followed, were a definitive part of the American strategy to end World War II. Although hopeful that nuclear weapons might end the war, American officials—from President Truman to his commanding officers—did not expect the war to end right away. Signs indicated that more atomic weapons were necessary, and U.S. leaders were rapidly moving to order more atomic strikes. Had the war continued, more atomic bombs would very likely have been used.

If they had been, would atomic bombs still be considered "war enders"? If not, would they have been more likely to have been used in the Cold War? Of course, there's no way to know for sure. But the third bomb was closer to being used than most realize.

ALEX WELLERSTEIN IS A HISTORIAN OF SCIENCE AND NUCLEAR WEAPONS. A PROFESSOR AT THE STEVENS INSTITUTE OF TECHNOLOGY, HE IS THE AUTHOR OF RESTRICTED DATA: THE NUCLEAR SECRECY BLOG

Power Exchange

IN THE WEEKS FOLLOWING JAPAN'S SURRENDER, the Allied powers considered removing Emperor Hirohito from power to charge him with war crimes. Supreme Commander for the Allied Powers Douglas MacArthur successfully argued that Hirohito's presence would win over the Japanese people during the upcoming occupation. On September 2, 1945, aboard the U.S.S. *Missouri*, Japanese and Allied officials signed the Japanese Instrument of Surrender, which allowed Hirohito to remain, but only as a figurehead. MacArthur would be in control of Japan. This relationship was emphasized when the two men first met on September 27, 1945, and were photographed side by side (above). MacArthur towers over Hirohito, diminishing his stature. The image shocked the Japanese, who had never seen an unidealized portrait of the emperor, whose carefully curated power was no more.

UNIVERSAL IMAGES GROUP/UNIVERSAL HISTORY ARCHIVE/A.BUM

The Demon Core

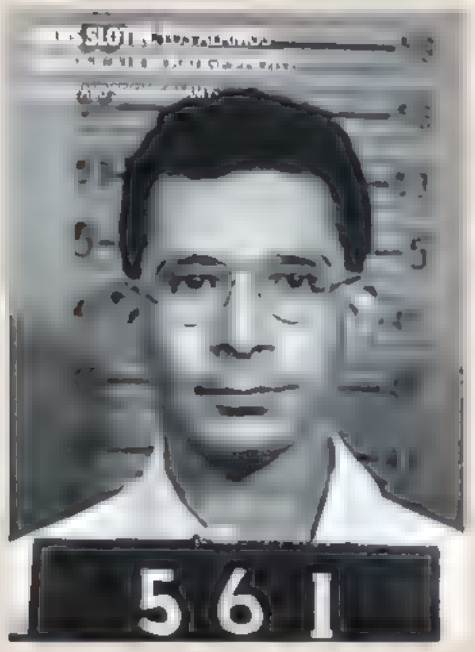
AFTER BEING FORGED at Los Alamos in August 1945, the last core did not travel to Japan. The core, which some accounts claim was nicknamed "Rufus," or even "Dirty Gerty," stayed in New Mexico and would be used in experimental work before earning its new nickname: the demon core.

ON AUGUST 21, 1945, physicist Harry Daghlian was performing a "criticality experiment," in which conditions were manipulated to bring the core to the brink of a chain reaction. Daghlian placed the core in an assembly made of bricks of tungsten carbide, a neutron reflector. Sensors warned him that the experiment was almost critical, so he removed a brick—which slipped from his hand and fell on the assembly. A brief chain reaction started, and Daghlian quickly stopped the experiment, but it was too late. Taken to the Los Alamos hospital a half hour after the accident, he reported a tingling sensation in his hands. He very quickly began to show the symptoms of what would become known as radiation sickness. For nearly a month he hung on, in either agony or a coma, until he died.

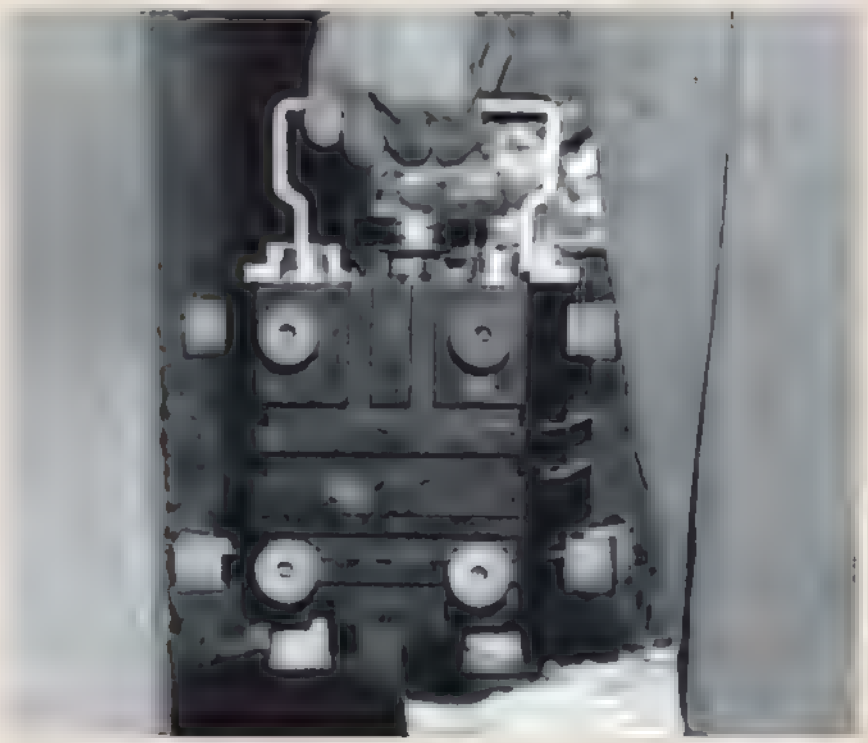
DESPITE THE DANGERS, such hand-operated experiments with the same core continued. In May 1946 Canadian physicist Louis Slotin was demonstrating criticality experiments to a group of scientists. The same plutonium core was placed inside of a hemisphere of beryllium (another neutron reflector), then Slotin began to slowly lower a beryllium lid to increase the core's reactivity, using a screwdriver to keep it from touching the base. But then the screwdriver slipped. The core was completely encompassed, and a chain reaction began. Slotin quickly removed the cover, but he had absorbed a fatal dose of radiation, even more than Daghlian. He died nine days later. That summer, Slotin had planned to take the "third core" with him to the Bikini Atoll in the Marshall Islands, where the United States was hosting its first postwar nuclear testing series. But Slotin's fatal accident caused the core to be too radioactive to transport, and it was instead shelved for the time being.

THE DEMON CORE killed two men, but its ultimate fate is unconfirmed. Researcher Glenn McDuff at Los Alamos believes it was eventually melted down and recycled, to become part of another bomb in the U.S. arsenal—possibly as one of the nuclear tests conducted over the course of the Cold War. Or it is still out there, somewhere, in a missile silo, submarine, or storage bunker—an unfulfilled but very real threat?

LOS ALAMOS NATIONAL LABORATORY



ALL ASSEMBLY REQUIRED
The bomb for the Trinity test in July 1945 had to be assembled by hand by the scientists of the Manhattan Project (above). Physicists Harry Daghlian (center) and Louis Slotin (in sunglasses) observe while teammate Herbert Lehr adjusts the placement of the core in the Gadget device. All are dressed in civilian clothing with no protective gear.

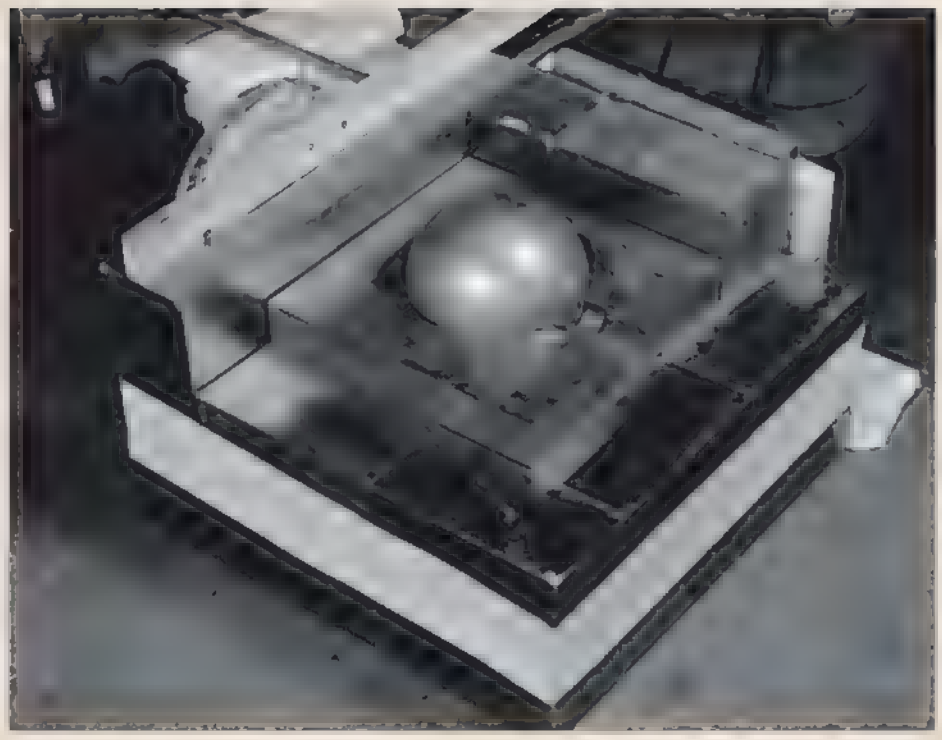


LOS ALAMOS NATIONAL LABORATORY

CORES FOR THE FIRST ATOMIC BOMBS WERE TRANSPORTED FROM PLACE TO PLACE IN SPECIALLY DESIGNED CARRYING CASES (ABOVE). THEY WERE MADE OUT OF MAGNESIUM, CHOSEN BECAUSE OF ITS LIGHTNESS AND STABILITY FOR SHOCK ABSORPTION, RUBBER BUMPERS FASHIONED OUT OF TEST-TUBE STOPPERS WERE ATTACHED TO ALL SIDES.

THE BLUE FLASH

After the two accidents that took the lives of Daghlian and Slotin, officials used both incidents to better understand what went wrong and develop better procedures. In Daghlian's 1945 criticality experiment (re-creation right), the plutonium core sat nestled among blocks of neutron-reflecting tungsten carbide. In Slotin's experiment (re-creation below), he manipulated a beryllium hemisphere above the core with a screwdriver. In both instances, the men were utilizing a hands-on approach, which proved fatal. In a 1956 report by the U.S. Atomic Energy Commission, scientists revisited past incidents, including these two, to create safer methods of handling radioactive materials, including having a minimum of two people performing experiments and the development of remote-controlled testing.



BELOW AND RIGHT: NATURE AND SCIENCE/ALAMY STOCK PHOTO

Kilwa, City of Coral and Gold

African, Arabian, and Persian cultures fed the rise of Kilwa, once one of the richest cities on Africa's Swahili coast. The trade in gold funded lavish building projects that would dazzle visitors until the city was toppled by Portuguese colonists.

Spectacular ruins cluster on the island of Kilwa Kisiwani, more than a mile from the coast of modern-day Tanzania. The remnants of a palace and a great mosque, built partly of coral stone, are reminders of the time when the gold trade of east Africa flowed through this tiny island.

During its medieval heyday, Kilwa was the principal port in a string of coastal trading cities that formed along what became known as the Swahili coast. *Swahili* is derived from an Arabic word meaning "coastal dweller" and became the name for the regional language.

The local inhabitants, descendants of the Bantu people, blended their mother tongue with adopted words from Persian and Arabic. Arabian and Persian customs are also reflected in the architecture, art, and religion of Swahili culture. All bear strong imprints of the intermingling elements among these peoples.

The connections between the Swahili coast and the Islamic world would later play into 19th-century European colonialist views of sites like Kilwa. Convinced of the "inferiority" of Africans to non-Africans, European scholars, like the British explorer Richard Burton, who visited Kilwa in 1859, believed that the indigenous African culture was incapable of developing stone-built cities. Kilwa, he and others claimed, must have been entirely the work of outsiders.

Recent archaeological discoveries have shown that the reality was more complex. Kilwa and other trading cities of the Swahili coast grew out of a complex mix of influences, starting on a strong foundation of local East African tradition.

Sifting the Chronicle

The first significant archaeological excavation in Kilwa lasted from 1958 to 1965. It was directed by British archaeologist Neville Chittick, who revealed a history that overturned the colonialist "outsider" theory.

Chittick concluded that the majority of Kilwa's population was African. Some of the elite often had origins in the Islamic lands on the other side of the Indian Ocean, but Chittick found evidence to suggest that the island's rulers did not hail directly from those lands. They

THE RUINS OF the Husuni Kubwa, the palace-fort of Kilwa, Tanzania, overlook the Indian Ocean. The 14th-century sultan's residence boasted more than a hundred rooms.

ALAMY/ACI

COIN MINTED IN KILWA BY THE 14TH-CENTURY SULTAN SULAIMAN IBN AL-HASAN BRITISH MUSEUM, LONDON SCALA, FLORENCE

1840s
Dwindling trade leads to the abandonment of Kilwa, once a rich medieval sultanate on the Swahili coast

1859
Explorer Richard Burton visits Kilwa's ruins and expresses doubt that Africans could have built them.

1958–1965
Neville Chittick's excavations of Kilwa frame a more complex understanding of Swahili culture.

1981
UNESCO designates the monuments of Kilwa, including its great mosque, as a World Heritage site.

belonged to Afro-Arabian families established for generations in Africa.

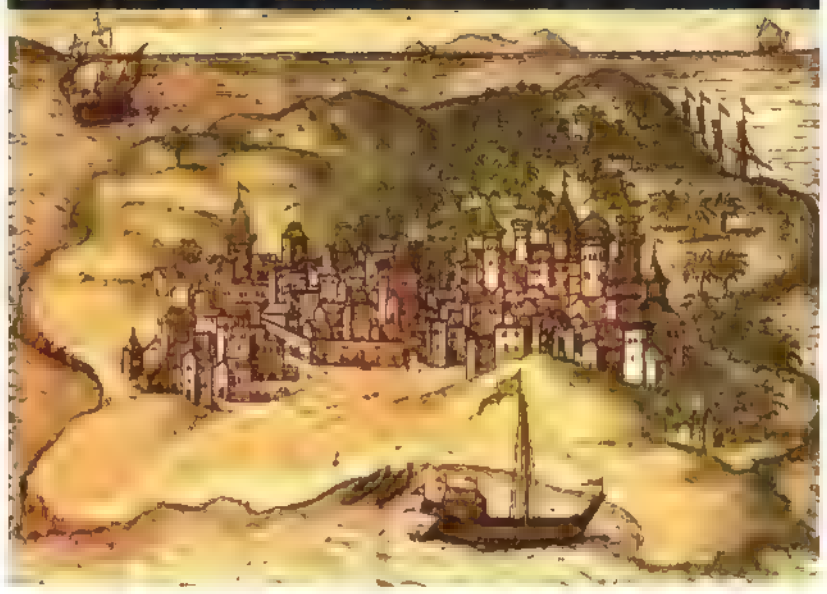
As an aid to dating the various phases of Kilwa's history, Chittick relied heavily on the Kilwa Chronicle, a medieval genealogy of the city state's kings. This text, together with the site's material culture such as coins, pottery, and other artifacts, enabled Chittick and later scholars to piece together Kilwa's rich and complex history.

Rise of the Swahili

The island of Kilwa was settled as early as the fourth century. In the eighth century the blended Swahili culture began to take shape and united the African coast from Somalia in the north to Mozambique in the south. Small-time Swahili traders started to see possibilities for more grandiose trade operations. As Muslim traders began to flow in and out of the region, Islam began to gain a foothold. The first

FRUITFUL TRADE

PORTUGUESE CHRONICLER Gaspar Correia, writing in the early 16th century, described Kilwa as a large city encircled by walls: "Within these there are perhaps 12,000 inhabitants. The country all round is very luxurious with many trees and gardens of all sorts of vegetables, citrons, lemons, and the best sweet oranges that were ever seen."



A PORTUGUESE ENGRAVING DEPICTING THE MONUMENTAL BUILDINGS OF KILWA AROUND 1590 ALAMY/NGS

THE SULTAN'S PALACE OF KILWA KNOWN AS THE HUSUNI KUBWA, WAS FIRST BUILT IN THE 14TH CENTURY. 3-D IMAGING

TOURNEZ S'IL VOUS PLAÎT PRODUCTIONS - 2018

IN 1962 Neville Chittick excavated the ruins of the Husuni Kubwa palace in Kilwa (see photograph on page 93), and identified the sultan's apartments and a mosque. The large courtyard is now believed to have been a caravansary, a staging post where merchants could rest and goods would be stored before being reloaded onto distinctive boats known as dhows (above), single-masted vessels commonly used in Indian Ocean commerce.

mosque on Kilwa has been dated to around A.D. 800.

Kilwa's rise to power dawned with the founding of the Kilwa sultanate. The dynastic founder was, according to the Kilwa Chronicle, an 11th-century adventurer, Ali ibn al-Hassan Shirazi, whose name suggests he originated from Shiraz in Persia. In line with Chittick's view, historians now believe he was probably born into an established African family who had Persian roots.

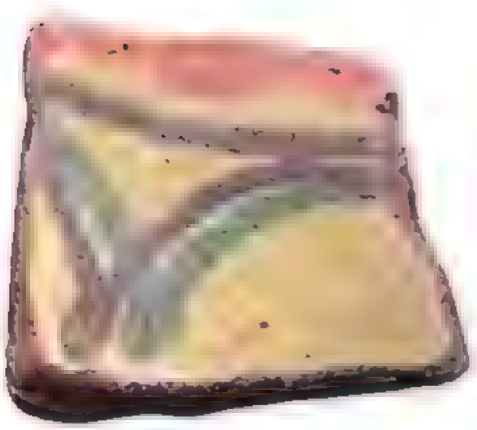
Under Ali and the Shirazi, Kilwa started to rival the preeminent trading center of Mogadishu, far to the north. Already growing wealthy from trade in ivory and tortoise shell, Kilwan rulers began to eye the most lucrative commodity of all—gold.

Flowing out of the interior of southern Africa, gold had been traditionally traded out of the port of Sofala, located in today's Mozambique. Starting during the Shirazi's rule, Kilwa started to extend its influence to control Sofala as its southern outpost.

From the late 1200s, another Afro-Arabian dynasty, the Mahdali, took over the Kilwa Sultanate. Consolidation of economic power continued until the entire East African gold trade came under Kilwan control.

Dhows, the sailing ships characteristic of East Africa, set out from Kilwa and Sofala laden with gold, grain, wood, and ivory. They were driven by the monsoon winds across the Indian Ocean to India and China, as well as to Arabia and Persia. Europe's growing dependency on hard currency also drove demand for Swahili gold.

In return, Kilwa imported cotton, ceramics, Chinese porcelain, and silk. As it grew rich, the city started to



Fragments of glazed ceramic or Chinese porcelain were sometimes embedded in the walls as decoration.

A FRAGMENT OF PAINTED CERAMIC FROM KILWA

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49180 Holy Land Silver Shekel of Tyre tetradrachm coin. "Thirty Pieces of Silver" 1" 126 BC.....**$700**

52782 Roman Marble head of a goddess or muse. Comes on a base. 8 ½" 100 AD.....**$1,500**

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54092 Greek Silver Alexander the Great tetradrachm coin. 1" 336 BC **$500**

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54219 Greek Silver tetradrachm coin of Athena. 1 ¼" 109 BC.**$2,000**

54227 Greek Gold Stater of Philip II of Macedon. ¾" 359 BC...**$7,000**

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54230 Byzantine Gold flattened double cross pendant with crucifixion of Jesus, three angels and inscriptions. 1 ¾" 900 AD.....**$4,000**

54260 American Gold Atocha shipwreck coin. 1" 1622 AD.....**$4,000**

54394 Egyptian Gold pendant of a Pharaoh. 1 ½" 305 BC.....**$5,000**

54395 Holy Land Gold pendant/brooch with two seven-branched Menorahs. Bird-like animals on the bottom. 1 ¾" 1700 AD....**$6,000**

54416 Persian Hollow gold ram head pendant. 2" 200 BC.....**$8,000**

54417 Roman Gold lion head pendant. 1 ¼" 100 AD.....**$4,000**

54424 Roman Gold Medusa pendant. 1 ¼" 100 AD.....**$6,000**

54432 Greek Gold pendant with a portrait of a goddess with a very ornamented bird on her head. 1 ½" 400 BC.....**$8,000**

54433 Holy Land Gold pendant of a bearded man. 1 ¾" 100 AD..**$8,000**

54474 Greek Bronze sword. 18 ¾" 400 BC.....**$1,800**

54482 Roman Terracotta oil lamp of Thetis on a dolphin. 4" 100 AD **$300**

54510 Byzantine Bronze cross pendant with image of Madonna and Child. 2 ¼" 600 AD.....**$700**

54511 Byzantine Bronze cross pendant with Jesus. 3" 600 AD..**$700**

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THE PRAYER ROOM in the Kilwa Great Mosque is built partly from coral stone. Begun in the 11th century, it is the oldest surviving mosque in East Africa.

NIGEL PAVITT/ALAMY/ACI

mint its own coins. Elaborate structures arose around the city, built using the island's distinctive coral stone.

Collected from local reefs at low tide, the coral was worked into blocks while still soft and then cemented together with mortar. The interior walls would be smoothed, plastered, and sometimes decorated with embedded colorful fragments of glazed ceramics or Chinese porcelain, which have helped archaeologists when dating them.

The Great Mosque, begun in the 11th century, was expanded and beautified in the boom years that extended from the 12th through to the 15th century. The sprawling 14th-century palace of Husuni Kubwa combined the roles of a fort, a castle, and a warehouse.

The palace's architectural features are reminiscent of Abbasid Iraq, a cosmopolitan splendor that deeply impressed visitors. Historical accounts say that Chinese naval explorer Zheng He traveled to the Kilwa Sultanate and the Swahili coast between 1405 and 1433 on his famous Seven Voyages. When 14th-century Muslim traveler Ibn Battuta visited Kilwa, he described it as: "one of the most beautiful towns in the world."

The Sultanate Falls

In the early 16th century, Portugal was looking to colonize the valuable regions along the Swahili coast. In 1505 Francisco de Almeida occupied Kilwa, bringing the sultanate to an end after it refused to pay tribute. In the years that followed, Portugal captured swathes of East Africa and west India to control the lucrative Indian Ocean trading routes. In their new colony of Kilwa, they built the Gereza, a military fort to protect the port. One of its towers still stands.

In the early 1700s Portuguese colonies were invaded by the Sultanate of Oman, which rapidly occupied the East African coast. It was not enough to restore Kilwa to its former glory. The city was abandoned by the mid-19th century, but archaeological interest revived its fortunes. Declared a World Heritage site by UNESCO in 1981, Kilwa's ruins stand today as testimony to the robust Afro-Arabian culture that bloomed centuries ago.

—María José Noain

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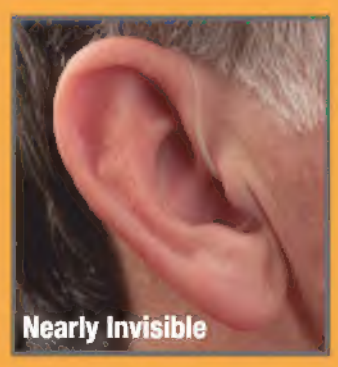

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Next Issue

THE BAYEUX TAPESTRY CONTAINS MANY DRAMATIC SCENES, INCLUDING WHAT MAY BE THE DEATH OF KING HAROLD II AT THE BATTLE OF HASTINGS.

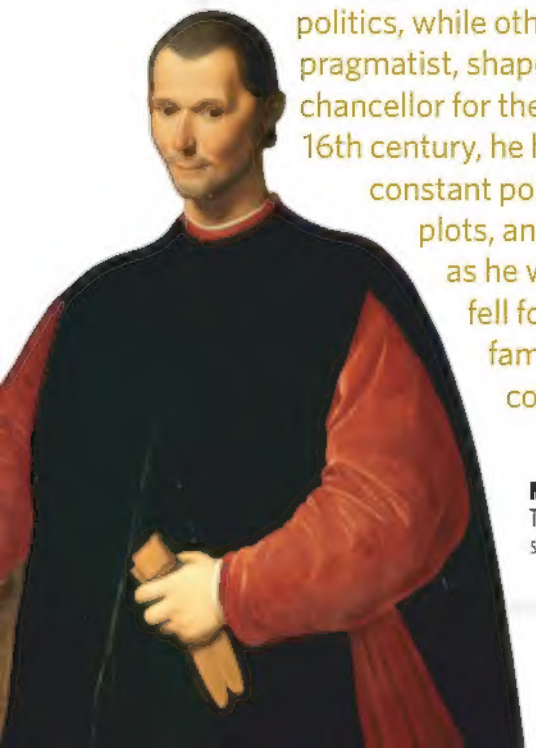
RMN IMAGES

A BATTLE TOLD IN TAPESTRY

THE BATTLE OF HASTINGS of 1066, in which the old Anglo-Saxon order was overthrown by William the Conqueror of Normandy, irreversibly changed England's law, hierarchy, and language. The buildup to this most celebrated of English battles is told most eloquently in the Bayeux Tapestry, discovered in the cathedral of the same name in Normandy. An amazing repository of historical testimony, this delicate strip of linen has survived the perilous journey to the present to tell its amazing story.

MASTER OF MACHINATIONS

FOR NICCOLÒ MACHIAVELLI (1469-1527), politics came down to power—how to get it and, most important, how to keep it. Today, many link the wily Florentine with cunning, and even outright immorality, in politics, while others see Machiavelli as a pragmatist, shaped by his environment: As chancellor for the Florentine republic in the 16th century, he had to navigate a world of constant political intrigue, murderous plots, and conspiracies. As adept as he was at the game, he still fell foul of the powerful Medici family, a misstep that nearly cost him his life.



MACHIAVELLI, PORTRAIT BY SANTI DI TITO. PALAZZO VECCHIO, FLORENCE

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All Hail Queen Tiye

Strong female leadership was respected by ancient Egyptians. The Great Royal Wife of the pharaoh Amenhotep III and mother of Akhenaten, Tiye played a highly influential role in both of their reigns and was highly regarded by foreign leaders at the peak of Egypt's imperial might.

The Buddha's Peaceful Revolution

Born in a time of deep social change in circa fifth-century B.C. India, Siddhartha Gautama's renunciation of worldliness earned him the title of Buddha—the "awakened one." In the third century B.C., his teachings were adopted as India's state religion, heralding Buddhism's role as a world faith.

The Sad Fate of "Little Caesar"

Ptolemy Caesarion, known as "little Caesar," was the child of Egypt and Rome, born to Cleopatra the Great and Julius Caesar in 47 B.C. The unlucky boy became a pawn in the plans of the mighty: Recognized as Caesar's heir by Mark Antony, Octavian had him killed at the age of 17.

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